

PERSONAL COMPUTING

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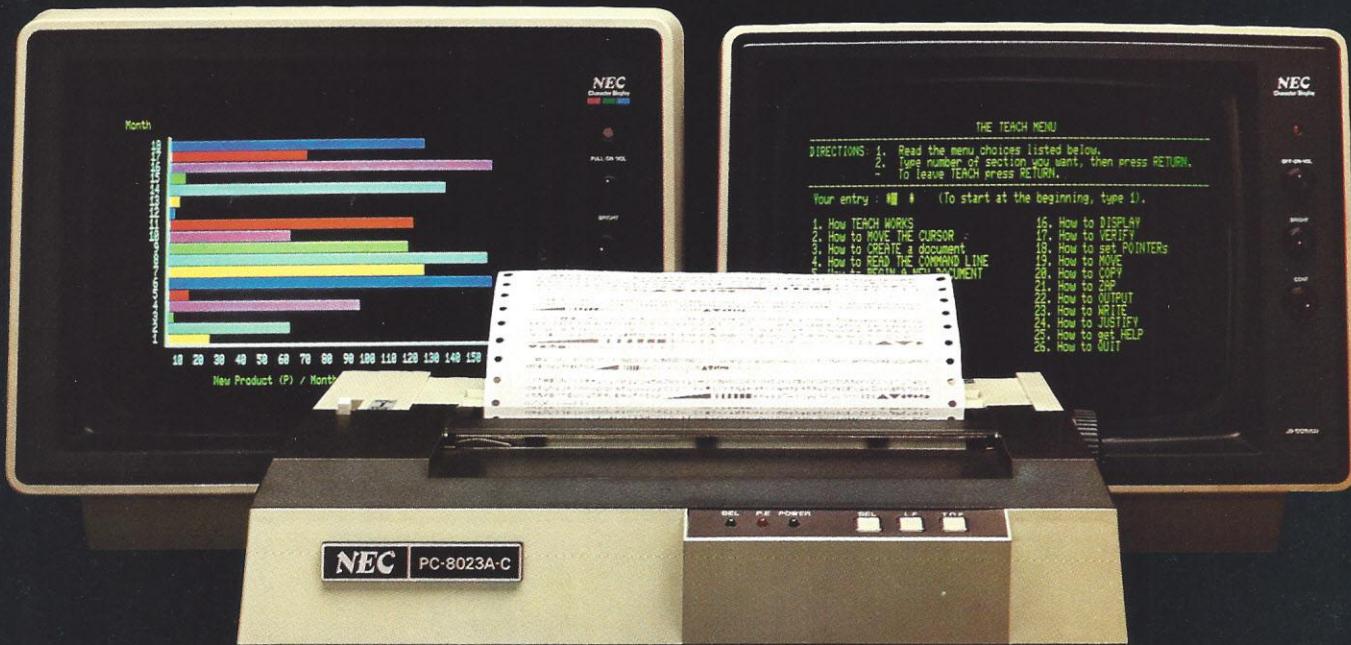
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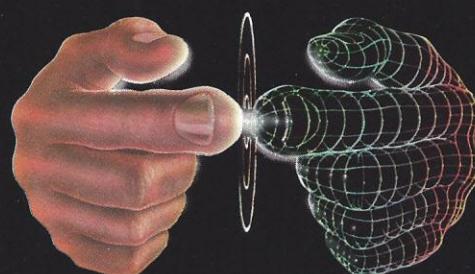


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January 1982
Vol. VI No. 1

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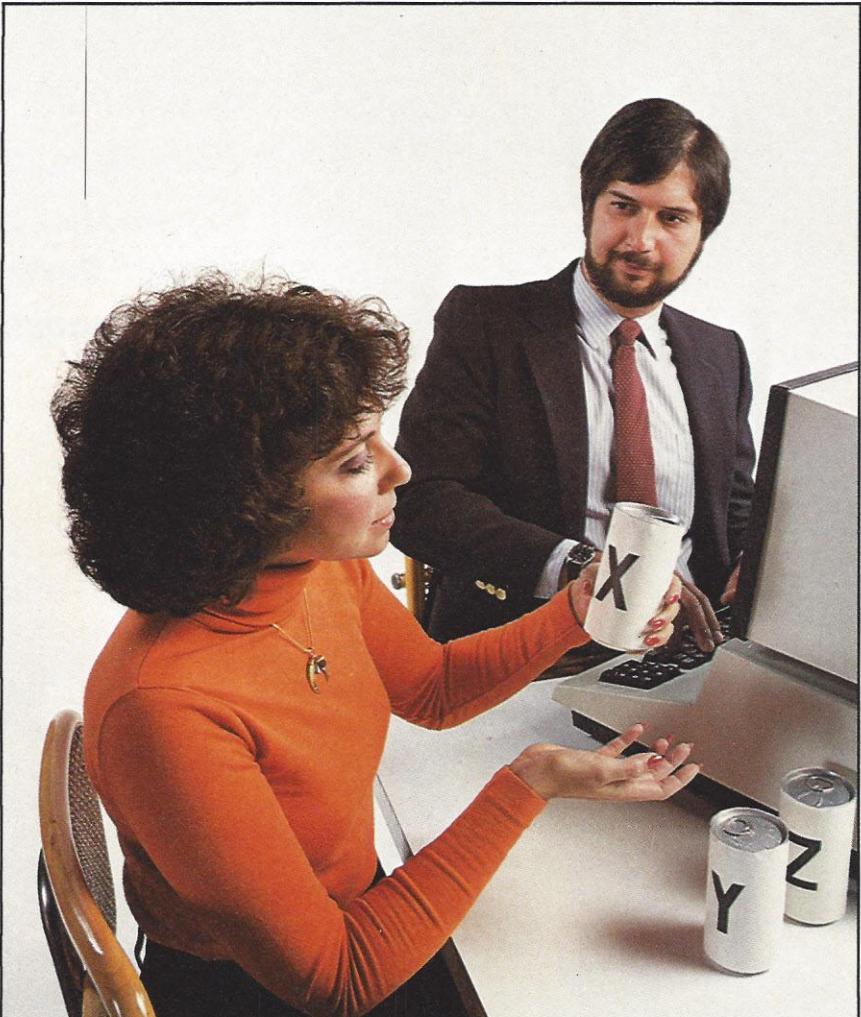
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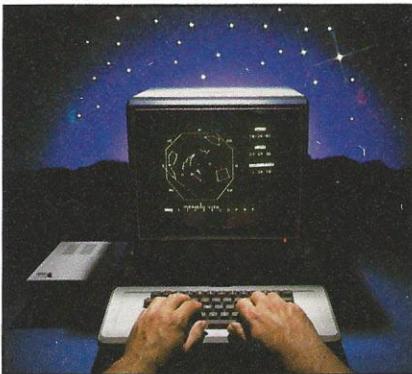
BEHIND THE COVER

The agony of translating market-research data into meaningful marketing information has been eased through the use of personal computers.

159,170 copies of this issue printed



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57 HIGH-LEVEL LANGUAGES—WHICH IS FOR YOU?

BY ROBERT HARWOOD There is indeed a rational way to determine which programming language is for you, if you specifically know what to look for.

69 ENERGY ANALYSIS FOR EFFECTIVE CONSUMPTION

BY JASON BIRMINGHAM AND HAL GLATZER It used to be that \$1 filled a Buick gas tank and \$10 heated a five-bedroom home. Now that same Buick and that same home could bankrupt many a pocket. But there's no need to fret: Accurate analysis of your energy use can keep you warm and mobile.

76 MAILING-LIST PACKAGES—A MAINSTAY FOR BUSINESS

BY ROBERT PERRY Businesses that at one time could not afford mailing lists can now target their audiences with a minimal investment. Here's what's available, and from whom.

PERSONAL COMPUTING (ISSN 0192-5490) is published monthly by Hayden Publishing Company, Inc., 50 Essex St., Rochelle Park, NJ 07662. James S. Mulholland, Jr., President. Printed at World Color Press, Inc., Mt. Vernon, IL. Second class postage paid at Saddle Brook, NJ and at additional mailing offices. Copyright® 1981, Hayden Publishing Company, Inc. All rights reserved. POSTMASTER: Please send form 3579 to PERSONAL COMPUTING, P.O. Box 1408, Riverton, NJ 08077. Subscription rates: U.S. 1 year (12 issues) \$18; 2 years (24 issues) \$33; 3 years (36 issues) \$46. Canada & Mexico: add \$4/year for surface mail, \$8/year for airmail. Other countries: add \$8/year for surface mail, \$36/year for airmail. Back issues: U.S.: \$4. All other countries: \$5.

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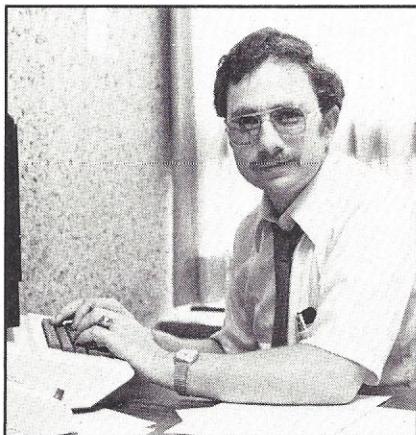
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Be it resolved



I can well remember New Year's when I was small. This was the time of year when everyone was making New Year's resolutions.

So, like everyone around me, I would pick several areas of my immediate concern and resolve to do a number of admirable things to improve those areas. I just as regularly never kept many of those resolutions—despite the fact that I really wanted to.

After a while, I decided the problem was that I made too many resolutions. I cut back, and found my resolve better for being undiluted. Thus I found I gave myself a much better chance of accomplishing the one thing that was most important at the time.

It's often like that in human endeavor. Programs that are too ambitious founder, while smaller, better defined and more pointed programs succeed. It seems that if we can keep our resolutions fixed on a single goal, then that goal is much more likely to be attained.

One goal that people in personal computing should fix their sights on in this new year is alleviating the problems with copyright law. This goal is so important that if we as personal-computer users don't find a

possible solution, we may find our lives seriously impaired because the use of our time- and money-saving computers may be restricted.

I'm not talking about copyright law in general. I'm referring to the way those laws are being applied to the video industry and how they could be applied, by extension, to the personal-computer industry.

Copyright laws are designed to protect authors and publishers from the theft of their property. Traditionally, that property has been books, magazines, newspapers or written music, and the law governing this property was fairly easy to enforce. Only large organizations with lots of machinery could copy (and steal) anything written in large volume.

Then along came the office copier. Enforcement became more difficult because anyone who worked in an office with a copy machine could duplicate anything printed. Then along came the personal computer and other electronic marvels, and enforcement became practically impossible.

Anyone with a personal computer can copy the software that will make the computer work. To be sure, there are protection schemes that make the copying difficult. But any protection scheme invented by humans can be defeated by humans. The software that was thus "protected"—someone's work, creativity, genius—is open to out-and-out theft.

Make no mistake about it. Copying a program (for other than archival-backup purposes with the publisher's consent) is theft. It's a violation of copyright law. Software authors and publishers think it should be stopped. But how?

The courts have recently taken up

that question in the home-video field. And the latest ruling on the question of copyright infringement (theft by copying over-the-air television broadcasts for replay) is that such actions are illegal. But, probably realizing the impossibility of enforcing the law, the court says the manufacturers of the recording equipment are responsible for law violations that stem from such use of videocassette recorders. The case is being appealed.

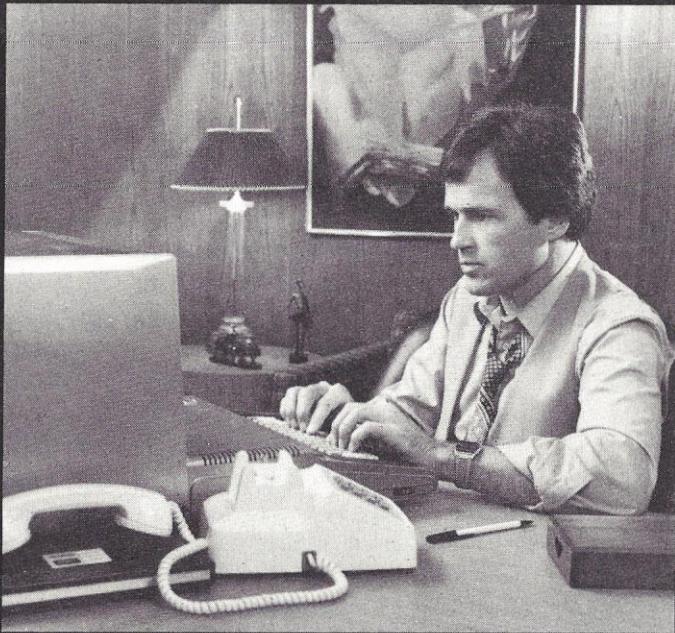
Besides the fact that the ruling uses the same logic as would locking up Messrs. Smith & Wesson because a spouse is shot in a marital quarrel, it clearly can't be applied to personal computing. Should manufacturers be held liable because their products perform their intended purpose, one part of which can be performed unlawfully? We think not.

What should be done? It seems clear that a change is needed in copyright law so it can deal with technology. We won't take sides on what the law should say, but it seems that the law just can't cope with modern life.

Let's set a goal and make a resolution to get a sensible change in copyright laws that can handle everyday technology. If you're in the industry, work within your firm to that end. If you're not, write to your national legislators to get the law changed, before manufacturers do something we don't want, just to protect themselves.

In the meantime, don't be a thief. Get your software legally, through authorized sources. Good software is really worth the price you pay for it. Your computer is useless without it.

Warren Gabel



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FEEDBACK

Educational enlightenment

Dear Editor:

I have just put down your September 1981 issue and found that the story on educational computing by Lee The' has remained in my thoughts. The article was enlightening and has left me with a desire to learn more about this aspect of small computer use.

Having access to a personal computer and looking for productive ways to engage my talents, I feel that programming for educational purposes would be a worthwhile endeavor. If you could provide me with information on organizations knowledgeable in this area, I would be most appreciative.

Martin G. Chaney
Meridian, ID

Editor's note: There are indeed quite a few sources of information on educational computing. One such organization is the Minnesota Educational Computing Consortium (MECC), 2520 Broadway Dr., St. Paul, MN 55113. We also suggest that you contact your local or regional school district for more information.

Needs help

Dear Editor:

A little over a year ago I purchased my first TRS-80 Model I, Level II. Six months ago I increased the capacity to 64k and added a modem. It wasn't long before I found the programs I was using or writing were quite long and time consuming.

Unfortunately I live in an area where the nearest computer center is

well over an hour's drive away. After reading your article on disk drives there was no question that this was my next add-on. I must admit however, that I am at somewhat of a disadvantage and have several unanswered questions.

Any assistance you can give in getting me on the right track would be appreciated.

Ralph Paul
Bemus Point, NY

Editor's note: Help is on the way. The February 1982 issue of Personal Computing will feature a special report on mass-storage systems. The article will detail the different tapes, floppy disks and rigid disks available on the market. Buzz words will be explained, specifying hints, and the article will include a special buyers' guide.

Newsletter info

Dear Editor:

I just subscribed to Personal Computing and received my first issue the other day. In it I noticed that you mentioned the medical newsletter put out by Charles Mann and Associates.

I would like you to know that we, too, publish a newsletter for physicians. It's called *ComputerTalk for the Physician* with a focus on offering practical advice and informative editorial for the first-time buyer. The annual subscription rate is \$39. We publish monthly.

We also publish a sister publication for pharmacists.

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Translation please

Dear Editor:

With respect to your article "A Computerized Cookbook; Help for the Gourmet," (November 1981), do you have plans to publish this for the Apple II? I'm not capable of making such a translation at this point.

Robert E. Daily
Alma, MI

Editor's Note: At this time we have no plans to publish a translation of this program. Your local computer dealer could be of some assistance in this matter.

Home uses

Dear Editor:

I appreciated your article "Put yourself in control with personal computing," (December 1981). However, I think it may have been limited in scope as to home uses of personal computers.

These machines are not only watering lawns. Their presence is felt in every room of the house. If you're in the kitchen, the personal computer can be helping you stay on your diet. If you're looking in the bathroom medicine cabinet, your computer can make sure that you are not taking a drug that is contraindicated by another drug. If you're in the kid's room or home office, the myriad of uses is almost limitless.

What I want to know is this: Do you plan to publish other ways in which I can use my personal computer? This was the first issue I received, and I'd like to know that I can expect more.

John Ansel
Richmond, VA

Editor's note: Fear not, John.

Each issue of Personal Computing is planned to help you in your quest for more information on how to use your personal computer. If you get a chance to look at some of our back issues, you'll see what we mean.

Radiation revisited

Dear Editor:

Following your May 1981 article on CRT radiation dosage (Are Computers Hazardous to Your Child's Health?), you printed a letter from Alois Treindl of Zurich (Feedback, September 1981) pointing out that radiation from a plane such as the face of a CRT is actually 16 times the amount used in your article.

Your author and Mr. Treindl are 1500 percent apart on estimates of real radiation dosage from CRTs. Since the theory that radiation is higher from a plane than from a point raises some questions not dealt with in your article, let me know if your advisors agree or disagree with Mr. Treindl's figures.

Richard Scott
Fairbanks, AK

Editor's note: According to our experts, planar radiation is much more intense than point-source radiation, other things being equal. But with CRTs, other things aren't equal.

The planar radiation emitted by the face of the CRT is secondary emission that is so low that it is almost unmeasurable—below the general background radiation of the earth's surface. The real radiation in a monitor or TV set is generated by the high-voltage power supply and the shunt regulator. This was a problem many years ago when this equipment was inadequately shielded by some manufacturers.

Now the shielding is built into the tubes themselves, along with metal

cages around the emission areas. The electron-beam gun at the back of the CRT is another potential source of much lower intensity. An increase in the lead content of the tubes eliminated both that and the planar radiation of the phosphor coating on the inside face of the CRT. So our author was right in her estimates, and planar radiation in this context is only of theoretic concern.

Always improving

Dear Editor:

Regarding my article, "Compress That Program" (July 1981), I have found a better way!

Lines 55320 to 55350 of "Despace" spend a lot of time resetting the line pointers. Several months after writing this article it occurred to me that the ROM resets these pointers, almost instantly, whenever you add, delete or edit a line in any program.

By making use of this ROM routine you can eliminate three lines of Despace and increase the execution speed significantly.

The following changes are required: In line 55315, change $V=X$ to $V=X 3$. Also, delete lines 55320, 55330 and 55350.

After loading your main program, make a note of its first line number. Then append and run Despace as described in the article. When it's finished, type: EDIT (the first line of your main program). Hit enter twice, once to enter the EDIT mode and once to escape. When you escape, the ROM will assume you've changed the program and will reset all the line pointers.

Now do the two pokes and the "CLEAR 50" requested by line 55500 and the job is done.

D. Wood
Winnipeg, Manitoba

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Healthy competition with Japan

Particularly in the electronics industry, Japanese competition is going to spur U.S. business on to an even stronger leadership position in the future, according to Ed Spencer, chairman of Honeywell and a member of the eight-man Japan-United States Economic Relations Group.

"Government and industry together must recognize the responsibilities that go along with open and free international trade and investment," Spencer said. "International competition between our industries is a healthy thing. Of course we have to be understanding of each other's national interests and domestic political problems. That is possible while maintaining the industrial strength toward which competition contributes. The consumers in Japan and the United States will be the beneficiaries."

Library seeks program descriptions

The Gutman Library at the Harvard University is seeking program descriptions for inclusion in its forthcoming second edition of Microcomputer Directory: Applications in Educational Settings, which will be published this spring.

Anyone involved in a project who uses personal computers for instructional and/or administrative purposes should contact: Microcomputer Directory, Gutman Library, Harvard University, Graduate School of Education, Appian Way, Cambridge, MA 02138.

Computers in education conference

The Second Annual Southern California Computers-in-Education Conference is scheduled for May 14-15, 1982 at University High School, Irvine, Calif. The conference will cover applications of computers in education, from kindergarten through two-year college. The sponsor is Computer-Using Educators.

The focus of the conference will be the use of computers in the school setting. All areas of the curriculum will be covered with emphasis on helping teachers get started using personal computers in the classroom. A free software exchange will make many programs available. Hands-on workshops and field trips are also planned.

Speakers are needed for the program. March 15, 1982 is the deadline for prospective speakers to make arrangements to come to the conference.

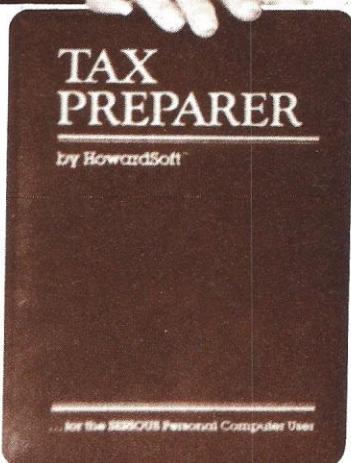
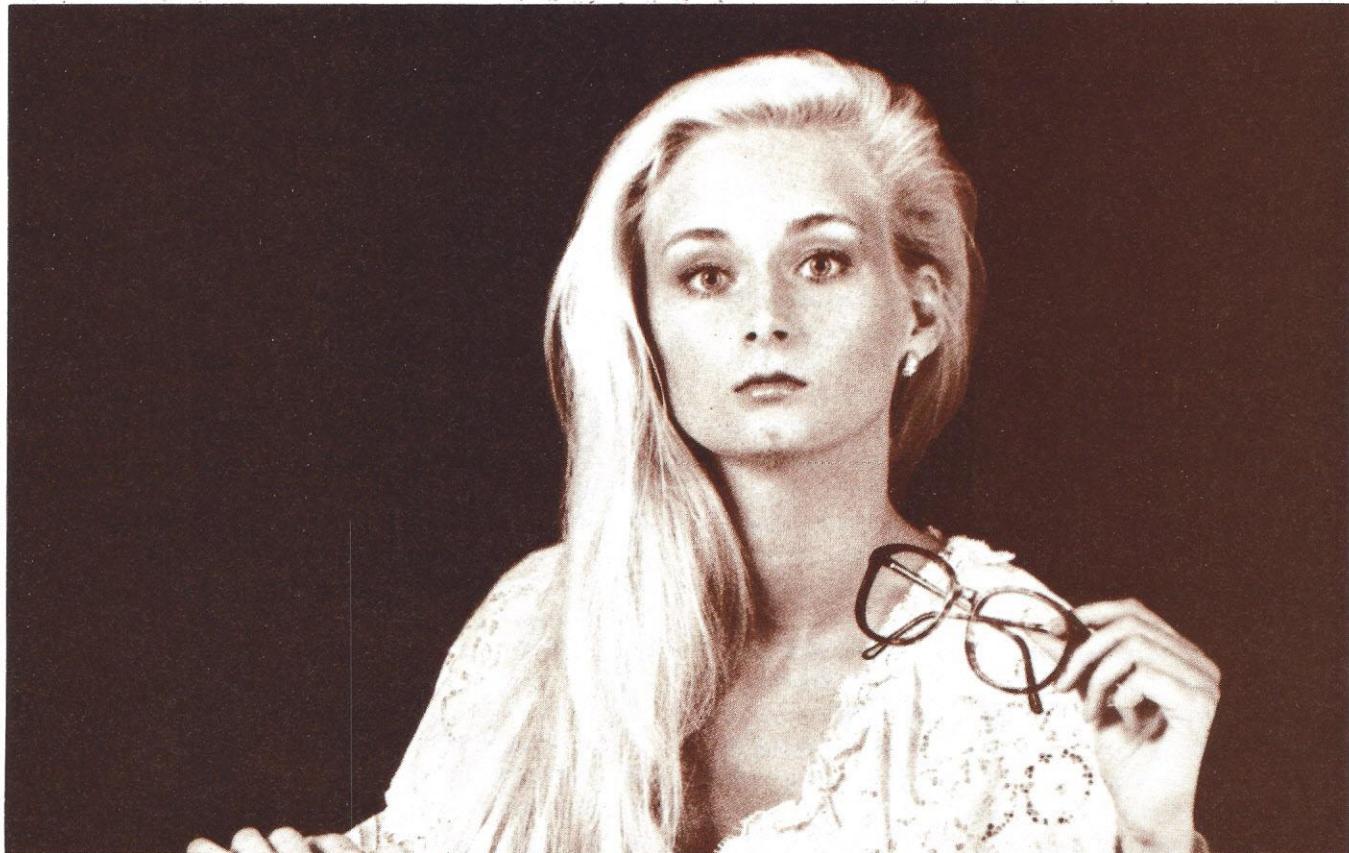
Further information can be obtained from Craig Walker, Arrowview Intermediate School, 2299 North "G" St., San Bernardino, CA 92405; (714) 886-9118.

Computer personnel demand up

Employer requests for computer personnel during the first nine months of 1981 were up 23 percent over the same period last year, reports Robert Half International, the world's largest data-processing recruiters.

Robert Half, who heads the organization, attributed the sharp rise in demand for data processors to three major factors: First, in this period of severe inflation, high interest rates and growing competitive pressures, businesses must generate, retrieve and analyze more information more quickly than ever before.

Secondly, the new inexpensive mini and personal computers are enabling smaller firms to realize the benefits of on-premises data-processing facilities for the first time. And thirdly, additional data processors are needed to maintain and upgrade existing systems, and to operate newer, more sophisticated hardware.



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A brave new computer world

In a short technological generation, the computer has shrunk from bigger than a room to the size of a breadbox. It then shrunk to smaller than a breadbox and now it's the size of a cracker-jack box.

The latest epoch in the history of the amazing shrinking machine has apparently just begun. A new Panasonic (Matsushita) computer, only 14 pounds and able to be held in the palm of one hand, has tossed down another gauntlet and ushered in yet another era in high technology's "small is beautiful" fixation.

Called The Link, or an HHC for hand-held computer, Panasonic officials emphasize that the device is not merely an upgrading of the programmable calculator. Rather, it's a true computing machine with the intelligence and power to handle a wide range of processing and telecommunications functions by itself.

"This is the first of a new generation of computers," says Bill Kopp, Panasonic merchandise manager, "because it is a state-of-the-art advance as significant as the development of the mainframe, mini and desktop computers. The HHC generation promises to make the computer as ubiquitous as the portable radio and calculator, but far more socially and economically influential."

The Link operates with an internal RAM memory of 4 kbytes, small by most personal computer standards, but this can be expanded by adding external RAM modules of 4 or 8 kbytes each. The internal ROM memory is 48k maximum, using three 16 kbyte program capsules.

But it is in the area of available peripheral components that distinguishes this computer from any of the other hand-held machines, which Panasonic considers to be only gilded calculators. For about \$2100 the system also includes a bus expander through which up to six other modules can be connected, a portable thermal printer, a programmable memory, a telecomputing system and a color television connector. These peripherals can be hooked up and then hauled in an attache case-like carrier to bring the office out into the field.

This is how Panasonic officials envision its use. According to these officials, the HHC is both a way of carrying office data anywhere it needs to be taken, and is an umbilical cord to the central office. This is accomplished mainly through an informa-

tion exchange over telephone wires via the computer's telecomputing modem.

Applying the HHC at outside locations, its uses are clearly varied. Salesmen can enter orders, prepare bids and make presentations; service personnel can order parts, update inventories, record calls and file bills; technicians can analyze problems and test equipment; distribution fleets can enter pickup and delivery data; and traveling executives can electronically post memos and receive messages.

All of this is accomplished by an array of programs developed for The Link by Panasonic, with Friends Amis, Inc., a San Francisco-based software firm. Titles include Field Computing, Mobile Medicine, Field Auditing and Portable Word Processing.

At least one high-technology consulting firm agrees with Panasonic's assessment that a new world of tiny hand-held computers is evolving. Future Computing, Inc., of Richardson, Texas, predicts that the worldwide annual growth in units sold of hand-held machines will be 103 percent through 1985, compared to a 30 percent yearly sales increase for the desktop personal computers. Future Computing expects that in 1985, 2.5 million HHCs will be sold, while 1.7 million desktop personal machines will change hands that year. These figures are again worldwide.

Other analysts are less optimistic, but are no less impressed. Although they assert that the personal computer will not be surpassed in the market by its smaller kin, they agree that the hand-held machine is a bold step forward in making computing devices a comfortable fixture in all segments of society.

An Apple for the family

Apple Computer has introduced a personal-computer system designed to meet the needs of the entire family. Called the Apple Family System, the unit combines its easy-to-use personal computer, software and manuals into a package geared for the first-time computer user.

"Apple has designed a system which is home oriented and provides meaningful applications for every member of the family—from the preschooler on up," states Michael Connor, marketing manager for the Apple II.

"This is a system that eases the first-time user's fear of computers. It is based on 'friendly' hardware

Before you buy any printer, give it this test.

Other IMP-4

GREAT GRAPHICS	<input type="checkbox"/> ?	2
SIMPLE PLUG-IN	<input type="checkbox"/> ?	2
3-WAY PAPER HANDLING	<input type="checkbox"/> ?	2
LIFETIME 9-WIRE PRINT HEAD	<input type="checkbox"/> ?	2
MODERN STYLING	<input type="checkbox"/> ?	2

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for each answer.

Only IMP-4 gives you bi-directional printing of dot addressable graphics at no extra cost. And with our Quad Density feature, you can even print 19008 dots per square inch! That's more than twice the resolution of Epson's finest!

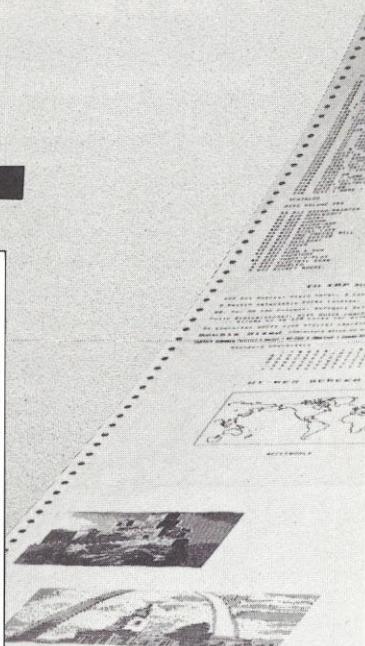
Apple, TRS-80, PET, Atari, HP... you name it. We've got the industry's widest range of interfaces ready to plug into your computer.

Axiom's IMP-4 lets you use single sheets, roll paper, or continuous tractor-fed forms. On other printers these features are probably expensive options, if available at all.

Axiom's rugged head prints good looking tightly formed characters with lower-case descenders, 6 different character sizes and boldfaces too, all printed bi-directionally at up to 100 cps!

Styling isn't the main reason you choose a printer, but isn't it nice to know you're getting a printer that will also look great in your office or home?

10



AXIOM's new IMP-4 scores a "10."

IMP-4 printer shown with
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CIRCLE 7

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Corvus Transforms the Personal Computer into a Powerful Business Tool.

In business, professional offices, and schools throughout the world, thousands of Corvus intelligent peripherals bring mass storage, increased speed, and multi-user capability to a variety of microcomputers. Current applications include accounts receivable and payable, medical records, mailing lists, inventories, word processing, insurance, mathematics and science, and other large and complex files.

Corvus proven Winchester disk technology provides 10 to 80 million bytes of capacity, fully compatible with your current operating system. This is up to 500 times the capacity of a floppy disk.

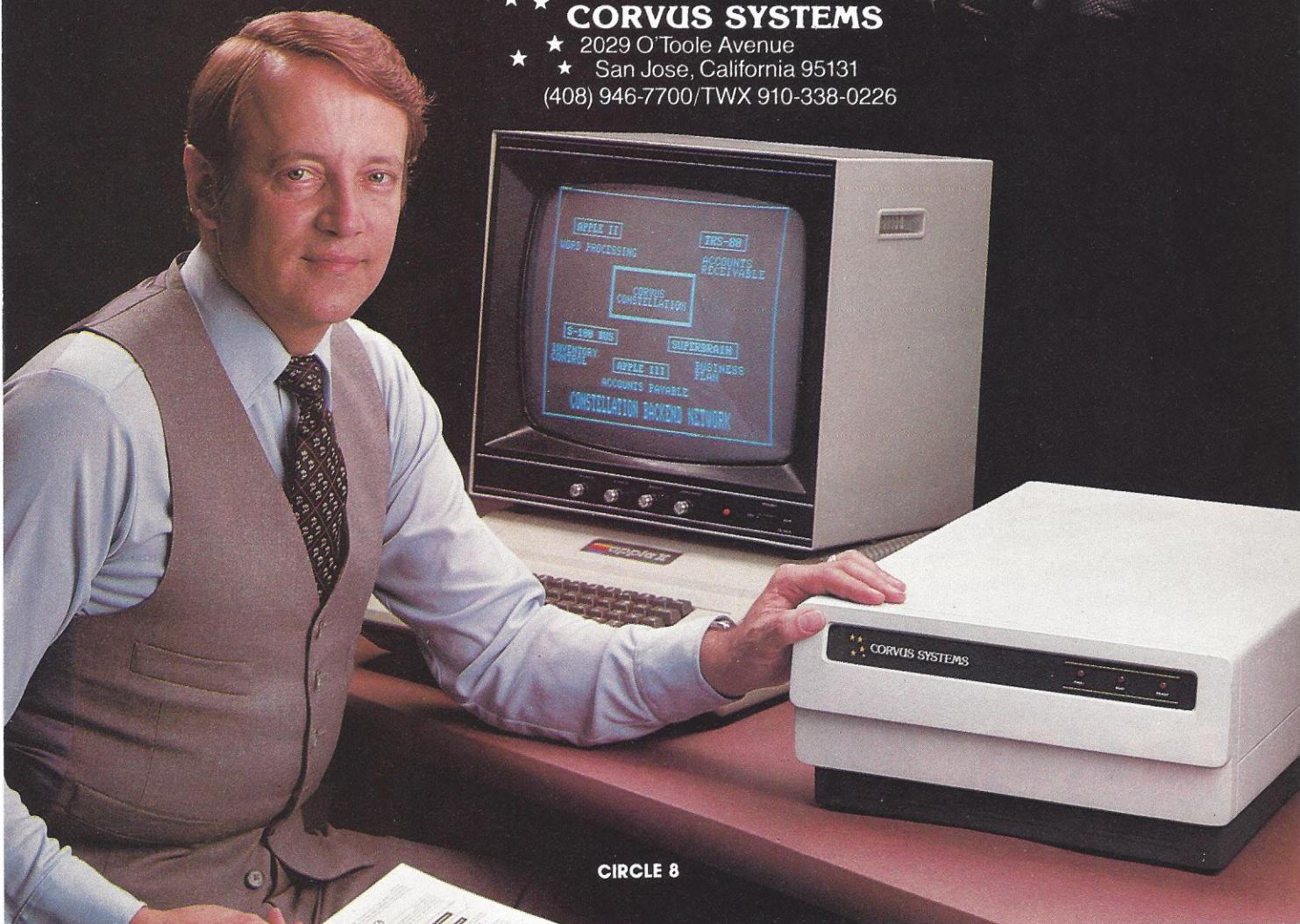
The Corvus CONSTELLATION links up to 64 computers in a state-of-the-art multi-processor network. It provides shared mass storage, pipes for inter-computer communication, and system spooling for sharing of peripherals such as printers. Performance far exceeds that of larger and more expensive networks.

Backup data protection and archival storage are provided by the Corvus MIRROR (Patent Pending), a low-cost backup using standard video cassette recorders.

Contact your local Corvus dealer for the full story about these innovative new products.



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and software and is equipped with clear, easy-to-understand instruction manuals. Even the individual who has never used a computer before will have the system operating in an hour."

Many of the system's applications involve aiding the family in the business of running a home, including personal finance, home budgeting, investment management, information management, record keeping, letter writing and address-file organization. The package also includes an array of skill-building, strategic games and can be used for educational purposes at levels from reading, typing and elementary math, to writing term papers.



The entire family will find uses for the new personal-computer system packaged by Apple Computer.

The Family System consists of the Apple II Plus computer, a disk drive with controller card, hand controllers and a modulator. It includes a new keyboard tutorial, a program that acquaints users with the computer and its use; an owner's guide, an introduction to the computer which guides the owner from unpacking the computer to running it; an educational software directory, allowing users to identify software that will meet their family's educational needs; seven software programs and the complete library of understandable, easy-to-use Apple II manuals.

The software includes AppleWriter, a text-editing program that can be used for writing letters, poems, novels or messages. The Personal Filing System is an organizer: It keeps files, address books, Christmas-card lists, recipe boxes and other information which clutters the house. The program enables information updates and is especially handy for home-run businesses—from paper routes to mail-order operations.

The Personal Finance Manager program helps the family track budgets, credit standings, taxes and personal investments. Both the Personal

Finance Manager and Personal Filing System help in the running of volunteer organizations—keeping personnel activity files, calendars and budgets.

The Typing Tutor program teaches touch typing. The other programs in the Family System—Apple Adventure, Olympic Decathlon and Apple Invaders—are strategic games for family or party entertainment.

As the family members become more familiar with their Apple, they may want to explore other applications such as business or school homework, tracking stock-market investments, learning a foreign language, developing colorful three-dimensional designs or practicing spelling. To help the family choose the additional software to best suit its needs, the Family System owner's guide and educations software directory includes "growth path" suggestions.

The price is \$2495.

Sears chooses Okidatas

Sears, Roebuck and Co. has contracted with Okidata to sell and service Okidata's Microline printers through Sears' new Business Systems Centers.

Okidata's Microline series of dot-matrix printers offers small systems and personal-computer users high-performance and low-cost printing capabilities. The printers feature a stored-energy matrix print head with a full year's warranty and print from 80 to 200 characters per second. The Sears Business Systems Centers will sell the Microline models 80, 83A and 84, and will provide customer training as well as service.

Says John M. Purtell, Jr., national manager of Sears Business Systems Centers, "We chose Okidata's Microline printers because they meet the criteria we have established for our merchandise for quality and for price/value relationships, and we believe they will fulfill the needs and expectations of our customers. Sears Business Systems Centers will make a complete line of quality brand-name products available to small businesses and business professionals."

The first five Sears Business Systems Centers recently opened in Boston, Chicago and Dallas on a test basis, says Purtell. "We are optimistic about the potential of this marketplace. Our hope isulti-

mately to have a national network of such centers."

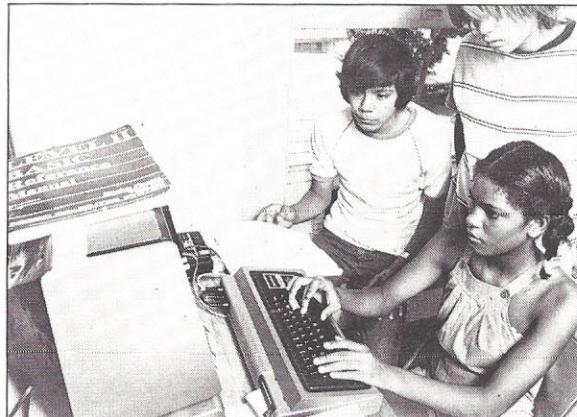
In addition of Okidata printers, Sears Business Systems Centers will carry the new IBM Personal Computers, as well as systems and business equipment from Wang, NEC, Hewlett-Packard, Vector, Texas Instruments, Exxon, Saxon, Panasonic and Hitachi.

Center aids problem juveniles

Problem students at the Creative Rapid Learning Center in Austin, Texas, are learning marketable skills with the help of their Radio Shack TRS-80 computer equipment.

The learning center is a pilot program conducted by The American Institute on Learning Differences and Juvenile Behavior in conjunction with Laguna Gloria Art Museum and the University of Texas YM/YWCA. It is a non-profit community-service organization dedicated to helping out-of-school youths between the ages of 11 and 18, and is being studied as a model program for its work with juvenile delinquents.

Charles Phillips, a Radio Shack senior vice-



president, reports, "We have been involved in a test to bring literacy and education to problem juveniles in the Austin area. Most kids are referred to this group by the courts and the Austin Independent School District. The group operates on the simple theory that if these kids can be educated they will find their way into the marketplace as productive citizens rather than potential problems.

"The cost of incarceration for an individual has been estimated at more than \$20,000 a year. That's

an impressive number to compare with a tax-paying citizen—which is the program's objective."

One of the first people to see the results of the program early in 1980 was then Juvenile Public Defender Cynthia Bryant. She comments, "The learning center has taken my 'worst' clients and has never failed with any of them...kids who were considered seriously disturbed and emotionally hopeless. Those same kids became happy...and they became educated."

Future plans at the center include using the personal-computer system to teach basic reading and mathematical skills, to help build self-esteem, and to evaluate and analyze the energy-saving value of various devices in a YMCA and U.S. Department of Labor sponsored "Energy Brigade" project.

The center currently uses eight TRS-80 systems.

First turtle learning center

The first Turtle Learning Center, organized to provide young people with an on-going opportunity to enjoy learning about personal computers and computer languages, has been opened in Richardson, Texas. Organized and operated by the Young Peoples' LOGO Association, the Turtle Learning Center will offer on-going individualized instruction in LOGO, turtle graphics, BASIC, Pilot and other languages appropriate for young people.

"Too often computer courses for young people run far too short a time and don't give youngsters the chance to really get into what personal computing is all about," states Jim Muller, YPLA president. "Our Turtle Learning Centers are going to change that."

For a monthly membership fee, youngsters will be able to spend a Saturday afternoon learning about LOGO and other computer languages. They will also gain experience with different peripherals, networking, telecommunications and the pure fun of a computer—from what makes the single-chip personal computers used in electronic toys tick to what personal computers can do for them.

"We're starting in a garage with about a dozen systems and about two dozen youngsters," says Muller. "Our plans call for the eventual opening of

continued on page 102



The Manager Series* from Microsoft™ turns a personal computer into an executive toolbox.

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Up your speed and efficiency with computerized inventory control

Sophisticated inventory-control software helps businessmen keep track

The cat is out of the bag. Despite what minicomputer manufacturers say to the contrary, it's an undeniable fact that the personal computer has grown up, and is steadily moving in on territory that the mini once claimed as exclusive.

With the recent introduction of sophisticated inventory-control software to the personal-computer market, great strides are being made in the business world.

"Personal-computer users have wanted to use their systems in inventory-control applications for some time, but the software just wasn't there," says James Harrison of SofTech International, creators of the STOCK FILE package for the Apple II.

According to Harrison, the inventory packages that have been marketed over the past couple of years simply haven't been able to offer users what they needed.

"The software that's on the market





PHOTO BY STEVE EISENBERG

Betsy Gilbert

now allows the user to pack four or five hundred items on a disk, which obviously is not much help," Harrison says.

STOCK FILE holds up to 9500 items on floppy disks, ample room for the present and future needs of the small- to average-size business. Harrison says this storage capability was achieved by employing a standard data-processing technique called ISAM (Index Sequential Access Method) when writing the software.

SofTech chose the Apple II as the vehicle for STOCK FILE primarily because of the overwhelming need among Apple users for such a program.

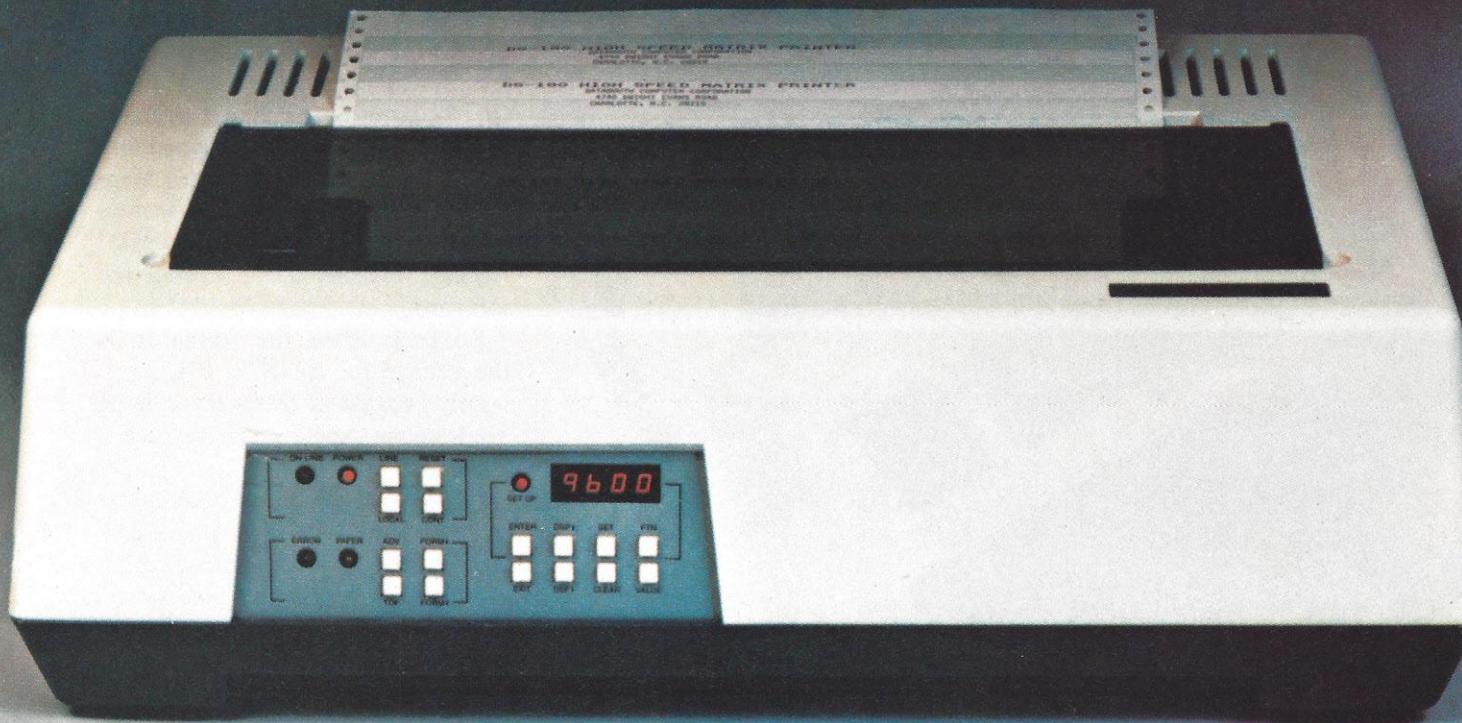
"I previously operated a computer store in Vancouver and I was constantly besieged with requests for inventory programs from Apple owners who were putting together general-business systems," Harrison says. "I checked around and found that there wasn't a good inventory program for the Apple, so we settled on that particular machine for the first STOCK FILE."

Jolyon Hallows rewrote the Apple Disk Operating system to bring fast access to the STOCK FILE user. Within the 9500 items stored in the program, the user can access any item in two seconds or less.

An additional feature, one that users are finding especially valuable, is STOCK FILE's extensive report-generation capability. Rather than the standardized reports featured in some of the other inventory packages, STOCK FILE allows the user to create his own specialized reports.

"We knew that in dealing with inventory, the average user needs about 50 separate reports," Harrison says, "so we provided the ability to create

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With so many matrix printers on the market today, it may seem tough to find exactly the right one for your application. Some models may offer the speed you need, others the communications flexibility and still others the forms handling capability. But no printer offers **all** the features you need...until now.

The DS180 matrix printer provides the total package of performance features and reliability required for applications such as CRT slave copy, remote terminal networks and small to mid-range systems. Not a "hobby-grade" printer, the DS180 is a real workhorse designed to handle your most demanding printer requirements. And pricing on the DS180 is hundreds of dollars below competitive units.

High Speed Printing—Bidirectional, logic-seeking printing at 180 cps offers throughput of over 200 lpm on average text. A 9-wire printhead life-tested at 650 million characters generates a 9x7 matrix with true lower case descenders and underlining.

Non-volatile Format Retention—a unique programming keypad featuring a non-volatile memory allows the user to configure the DS180 for virtually any application. Top of form, horizontal and vertical tabs, perforation skipover, communications parameters

and many other features may be programmed and stored from the keypad. When your system is powered down, the format is retained in memory. The DS180 even remembers the line where you stopped printing. There is no need to reset the top of form, margins, baud rate, etc....it's all stored in the memory. If you need to reconfigure for another application, simply load a new format into the memory.

Communications Versatility—The DS180 offers three interfaces including RS232, current loop and 8-bit parallel. Baud rates from 110-9600 may be selected. A 1K buffer and X-on, X-off hand-shaking ensure optimum throughput.

Forms Handling Flexibility—Adjustable tractors accommodate forms from 3"-15". The adjustable head can print 6-part forms crisply and clearly making the DS180 ideal for printing multipart invoices and shipping documents. Forms can be fed from the front or the bottom.

If you would like more information on how the DS180's low-cost total printer package can fill your application, give us a call at Datasouth. The DS180 is available for 30-day delivery from our sales/service distributors throughout the U.S.

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those reports. You can direct the computer to sort items according to the criteria you set down, based on your business and your particular application."

Filtering through

One of STOCK FILE's more enthusiastic users is Wood Griffiths, general manager of Les Hall Filter Service, in Vancouver, British Columbia.

"The efficiency this system has brought to our business is something we've dreamed about for years," Griffiths says.

His dreaming was justified. A warehouse distributor for approximately 50 manufacturers of industrial filter systems, Les Hall sells the filter systems used by a variety of industries ranging from mining to fishing to forestry. While sales are centered primarily in British Columbia, systems are also sold throughout the U.S. and Canada. That adds up to a large inventory volume.

Since 1959, when management at Les Hall decided to take stock of inventory on hand and what was needed, the company has been faced with a two-week ordeal of sifting through a massive card file for the required information.

"We were on the old Kardex system for years," Griffith says. "There were thousands of cards, each assigned a part number. Each time a transaction was made on a particular part—when it was purchased, its purchase price, when it was sold, what the customer paid for it—that transaction was written down on the card. We only conducted inventory once a year, and it was a chore everyone dreaded."

Manual inventory, even when performed with the greatest care, more often than not results in error. If you can imagine how laborious recording information on 10,000 transactions is, then you have a good idea how easy it is to make a mistake. At Les

Hall, even a one percent error factor meant problems. Those problems led Griffiths to seek out an alternative inventory-control system.

"We knew we needed a computer to handle our stock," he says. "There were a lot of systems on the market, but nothing fit our needs until STOCK FILE became available for the Apple II. Many of the higher-

offer. He is also impressed by the variety of reports the program can generate.

"We are using 26 active vendor codes," he says. "We can ask the computer to give us an inventory of value for one or all of those vendors. We simply key in the vendor code, ask for a listing of all the active or inactive part numbers within that

"Now when we want to know how many parts are used for manufacturing 2000 units, all we do is give the computer the 2000-unit figure and it automatically pulls out of inventory all the items that were used in the process."

priced systems provided features we didn't need, and they seemed to be rather inflexible. For a price that fit our budget, we got a powerful system that was designed for our particular application."

A growing system

The Les Hall system consists of the Apple II Plus with 48k of memory, four floppy disk drives, a printer and the STOCK FILE program. Since each disk holds approximately 3000 items, Griffiths feels the system will meet not only the company's present inventory needs, but future needs as well.

"This system is designed to grow as our stock grows," he states. "We currently have about 2200 items in our active parts file, and as that number increases, we'll simply use another disk."

Griffiths is especially impressed by STOCK FILE's fast retrieval speed, which, he claims, the more expensive systems he considered were unable to

code, and we've got them almost instantly. If we want to print a report, we just go to the PRINT REPORT sequence, and there's an entire menu for printing any report we want."

Griffiths recently ran a master-listing inventory for one of the 50 vendors with which his company does business. In 40 minutes, he knew the amount of business Les Hall had conducted with that vendor down to the last penny. Had he employed the old Kardex system, that procedure would have taken at least a day to complete.

"Not only is this system fast and efficient," Griffiths says, "but it also prevents a lot of the human errors that occur in a manual system. You really have to be determined to do something wrong to fool the computer."

Recovering the fumble

Frank Fry of Frank's Gun Shop in Yuma, Ariz., figures that what's good for the industrial segment is good for the sporting-goods market.

Like Les Hall, Frank's Gun Shop recently converted its inventory to the Apple II Plus and STOCK FILE.

"The change in the way we handle our stock is like night and day," Fry says. "Before, we were fumbling through hundreds of cards trying to get an idea of the stock we had on hand and which items we needed to reorder. Now it's just a matter of hitting a key and having the information in front of us."

A sporting-goods store leaning heavily toward firearms, the gun shop handles gun bodies, individual parts (firing pins, sights, etc.) and accessories (holsters, bullets and cleaning cloths). The shop also carries a line of police-related equipment. With only two full-time employees to run the store, keeping up with inventory is a big job.

For nearly 19 years, Fry tracked inventory with a standard card-file

system, relying on periodic visual inspection to stay on top of things. A complete inventory was conducted only once a year.

"The system just wasn't efficient,

point-of-sale work. The Apple worked fine; it was the software that came up lacking. Then STOCK FILE came along.

"I had almost given up hope of

"The system prevents a lot of the human errors that occur in a manual system. You really have to be determined to do something wrong to fool the computer."

but affordable alternatives weren't available for a store of this size," Fry says.

The situation changed with the influx of personal computers into the small-business market. Hoping to take advantage of low-cost computer power, Fry bought an Apple II in July 1980 to handle inventory and

finding an efficient way to handle my stock," Fry says. "Then I heard about this new program for the Apple. It's really made quite a difference."

Fry got STOCK FILE up and running on the Apple in August and is still in the process of entering active inventory items. When the conversion is complete, he expects to

Twenty questions to ask about inventory software

Buying inventory software will be one of your most important and most difficult decisions. Arm yourself with the specific questions below before asking a dealer about the performance of his inventory packages. If you plan to buy through mail order, send for a brochure first, and check to make sure it answers all your questions. If it doesn't, as it most likely won't, call the software house and get your questions answered.

Because each business is different, these questions should be considered a starting point. Add your unique considerations to them before you shop.

(These questions were prepared with the help of Ron Wong of AMD Consulting, Ltd., New York, NY, and Ron Sawyer of Lifeboat Associates, New York, NY.)

1. What type of inventory system do I need?
 - a. Finished goods
 - b. Raw materials
 - c. Retail
 - d. Pseudo-retail—buy and sell only
 - e. Multiple systems, including bills of materials
2. How are the system's item number codes derived? Does it differ substantially from your existing numbering system?
3. How many characters does the program allow for descriptions? (The more the better.)
4. Can it handle more than one price per item?
5. Does it allow you to include more than one vendor and one cost per item? If not, how does the system handle more than one vendor per item?
6. Will it allow for returns and adjustments to inventory?
7. How many inventory periods does it provide? Month- and Year-to-Date only? Multiple periods?
8. How quickly can you query a single item, and how? Do you query by description, item number or vendor; by two of those, or by all three?
9. Does it integrate with a General Ledger package? Accounts Receivable? Accounts Payable? Job Costing? Order Entry?
10. How much storage capacity do you reasonably need? (Ig-

have a running file of about 2500.

Fry's present system consists of the Apple II Plus, two disk drives and the STOCK FILE program. He plans to expand his number of drives within the next 12 months as his inventory grows.

While affordability was a big factor in choosing the Apple and STOCK FILE, Fry sees the extensive report-generation feature of the system as its biggest plus.

"We've got two separate sets of reports we're generating from the same disk," he says. The first is a price list for merchandise, which is available to the public. It gives the item, its part number and its price. The second parts list is for internal use, keeping Fry up to date on the status of each part.

"The machine is able to separate the two sets of reports, so when we want to print one of them we don't

have to print the other just to get the data we need," Fry says. "I didn't expect to find a feature like this on such a reasonably priced system."

The rest of the pack

Norm Mendon of Mission Manufacturing in Tempe, Ariz., seems quite content with the result of his recent conversion to computerized inventory.

"We installed a Commodore 8032 with the Accounting IV package in September and we've already seen a big difference in our efficiency," Mendon says.

Accounting IV, a product of Business Enhancement Corporation, was developed specifically for Commodore systems. In addition to its other general-business functions, it features an impressive inventory program. With the capacity to handle up to 2000 inventory items on a

single-sided floppy disk, the program allows the user to keep track of item shrinkage, old and new part numbers, vendor numbers, minimum and maximum quantities on hand and gross margins.

Mission needs that kind of capability. The company manufactures a home-cooling unit called Up-Dux, a product that eliminates the need for keeping doors and windows open when using an evaporative cooling system. Installed in the ceiling of every major room in a house, the Up-Dux ventilates through the home's attic, rather than through an open door or window. According to Mendon, this adds to a home's security as well as its cooling efficiency.

"The Up-Dux is small—only about a foot square, but each unit contains about 50 parts," Mendon says. "We sell through distributors all over the Southwest, so you can imagine what

more the minimum system because it will rarely hold enough records to accommodate your system.)

11. How many files can be written to each disk?

12. What reports and lists does the package provide?

- a. Master (or Stock) List
- b. Price List
- c. Back Order Report
- d. Order Report
- e. Departmental Summary
- f. Reorder Report
- g. End-of-month or End-of-Period Report
- h. End-of-Year Report
- i. Physical Inventory Worksheet
- j. Transaction Control or Audit Trail List
- k. Inventory Turnover Report

- I. Inventory Shrinkage/Overage Report
- m. Items On Order Report
- n. Returns and Adjustment Report
- o. Back Ordered Items Received Report

package provide?

- a. Average
- b. Weighted average
- c. Standard cost
- d. LIFO (Last In, First Out)
- e. FIFO (First In, First Out)
- f. Multiple methods

13. Does the program describe quantities *committed*, but not shipped in addition to items on hand and on order?

14. How does the package measure quantities? By unit or by measurement, such as dozens, quarts, ounces, gross, etc.?

15. Does the package provide for identifying inventory by warehouse or bin location?

16. What costing method do you need and what does the

17. Do your sales consist of cash and billing? Or only one way? How does the package handle them?

18. How does the package help you identify slow-moving items?

19. How does the package carry out sort and search functions? How many sorts and searches does it allow?

20. How long has the package been available? How many companies have used it and for how long?

keeping up with the inventory is like."

Until the computer system was installed, keeping up with the inventory was a tough job. Rather than a card file, Mission employed a loose-leaf notebook, and each page was assigned a particular part number. Every time a part was used in assembling an Up-Dux, someone had to make an entry in the notebook. That's what inventory tracking was like B.C. (before computer).

Although Mission is still in the process of converting its business operation over to the Commodore and Accounting IV, the company likes what it sees so far.

"Now when we want to know how many parts are used for manufacturing 2000 units, all we do is give the computer the 2000-unit figure and it automatically pulls out of inventory all the items that were used in the process," Mendon says. "This is allowing us to get back to the jobs we're supposed to be doing instead of scratching away in a notebook."

Lightening the load

James Hansen shares Mendon's feeling of relief. A successful dealer of antiques and fine art to a worldwide clientele, Hansen has learned over the past year what a difference computerizing inventory control can make.

"Unlike someone who has a retail store or a manufacturing operation, I don't have all of my inventory stored in one warehouse," Hansen says. "Since I work with clients all over the world, I have to keep track of pieces all over the world. Believe me, that's quite a task."

The load has lightened considerably since Hansen installed a N.N.C. Electronics Model 80-W computer with Peachtree Software's Series Five inventory package in his Santa Barbara, Calif., headquarters. Written in MicroSoft BASIC for any computer using a CP/M operating system, Series Five runs on either floppy or hard disks. The number of line items it handles is limited only by

the storage limitations of the disk.

"I decided to opt for a 10-megabyte hard disk and a supply of double-density floppies to handle my inventory load," says Hansen, who says that he anticipates tracking more than 100,000 items by the end of 1982.

Each time Hansen acquires a piece, everything he knows about it is stored in the inventory program—a description of the item, what he paid for it, where it's located and when it's scheduled to arrive. When he sells a piece, he also logs in the price, to whom it was sold, the conditions of the sale and where the item is being shipped.

"For 10 of the 11 years I've been in this business, I kept track of items I was buying and selling using a huge assortment of index cards," Hansen says. "If a client wanted to buy a specific piece, I could spend hours sifting through all those cards trying to locate the item. Sometimes I could find it and sometimes I couldn't. I wasted

a lot of time searching."

Now that the inventory tracking is computerized, Hansen is able to operate more efficiently. If a client calls from West Berlin seeking a painting by a specific artist, Hansen can have the computer sort through the file, assembled by either the artist's name or the art form, and locate what the client is looking for in a matter of seconds. If the painting is not available, Hansen can use the computer to locate another painting in which the client might be interested.

"In addition to the pieces I track for myself and for my clientele, I keep records of other dealers' inventory and that of a number of museums, Hansen states. The Series V keeps track of restoration information, auction pieces around the world—just about everything. When I think back to how I kept up with all this information without my computer system, I'm amazed that I lasted as long as I did."

Others in the family

The number of inventory packages for personal computers continues to grow as the need for fast and efficient inventory control increases in the small-business sector. The following are included in the current group.

- **MICROINV** from Compumax, which has been marketed to Apple, Commodore and TRS-80 users, was recently introduced as a package for the Atari business system as well. The package enables the user to handle up to 3000 inventory items on a single-sided floppy disk.

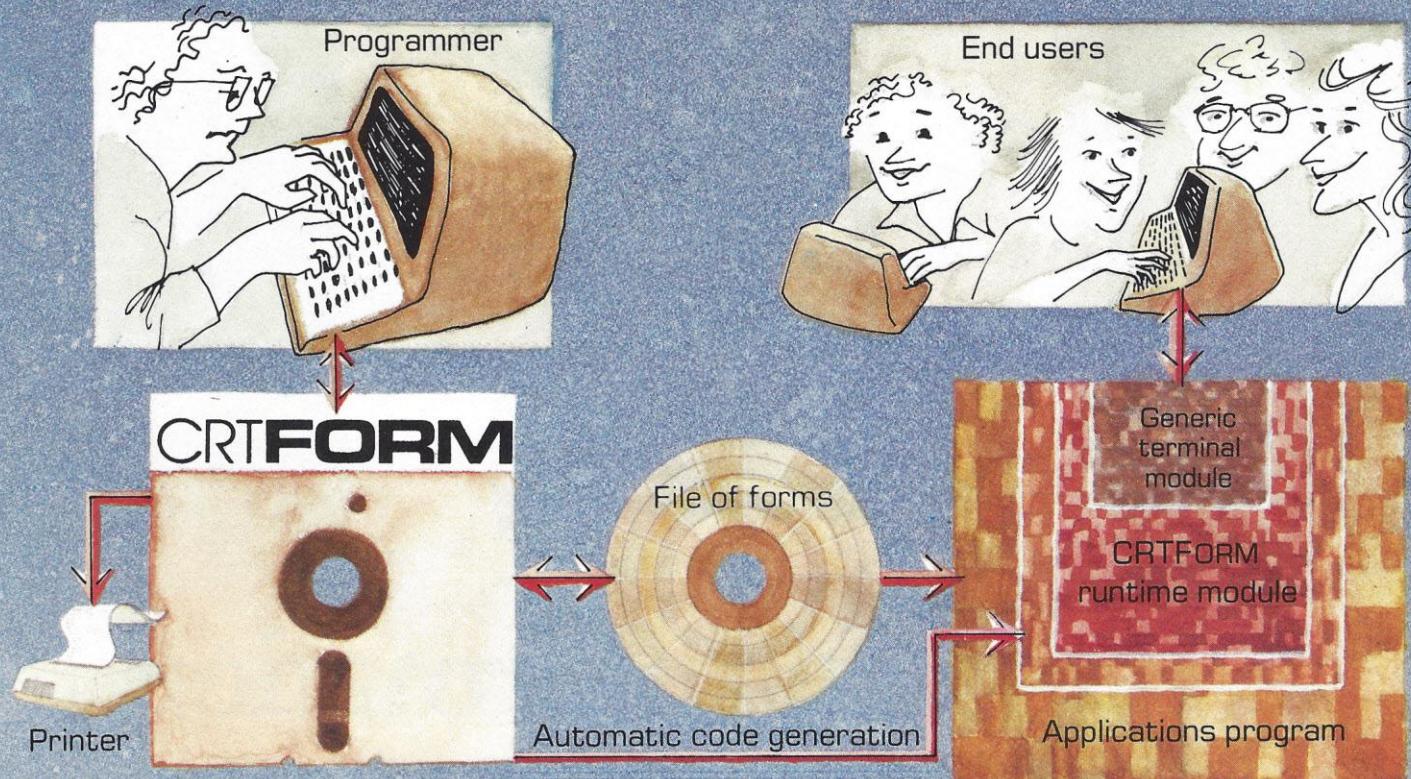
- **OEIC (Order Entry Inventory Control)** from American Business Systems runs on 16 of the market's most popular personal

computers, including TRS-80, Cromemco, Dynabyte, Altos, Onyx and Zilog. Written for single-sided, single-density floppy disks, the program supports 1000 open items, 1000 products and 750 customers on each disk.

- **INVENTORY** from Computer Place was written strictly for North Star's line of business computers. Run on a double-density disk, it holds up to 1800 line items and on a quad density, it holds 3600 items.

- **Structured Systems Group** offers an inventory package designed for any CP/M system. Simply called Inventory, it runs on either dual 8-inch floppy disks or hard disks, and handles up to 2000 items.

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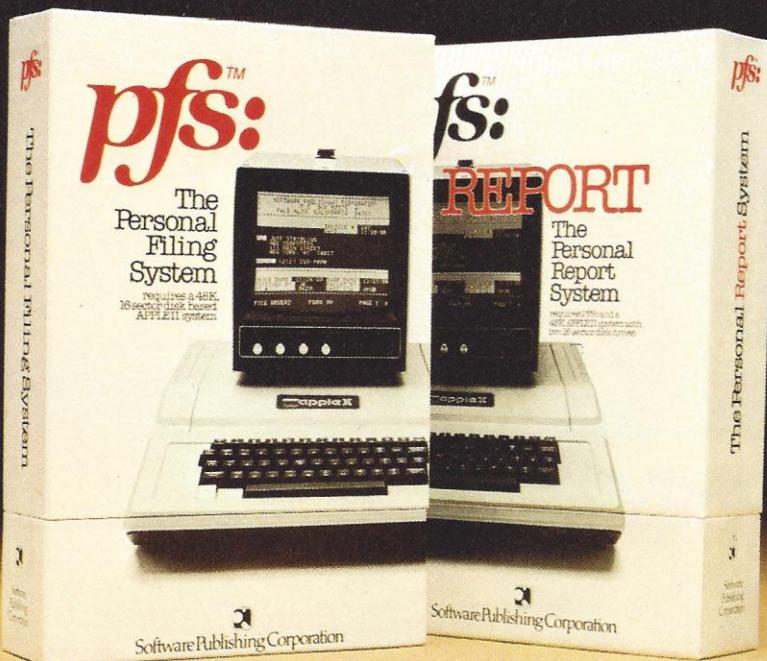
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BUSINESS COMPUTING

Turning to personal computers in the factory of the future

With personal computers having entered the manufacturing process, production methods are slowly becoming obsolete

Henry Ford in his time was known as something of an industrial pack rat because of his penchant for saving even the most seemingly worthless waste products and reusing them in his factories. One account describes him turning wood shavings into charcoal briquets and creosote and surfacing company roads with slag from his massive steel ovens. And though a hopeless scavenger, what grew out of his eccentricities clearly changed the course of industrial history. The development

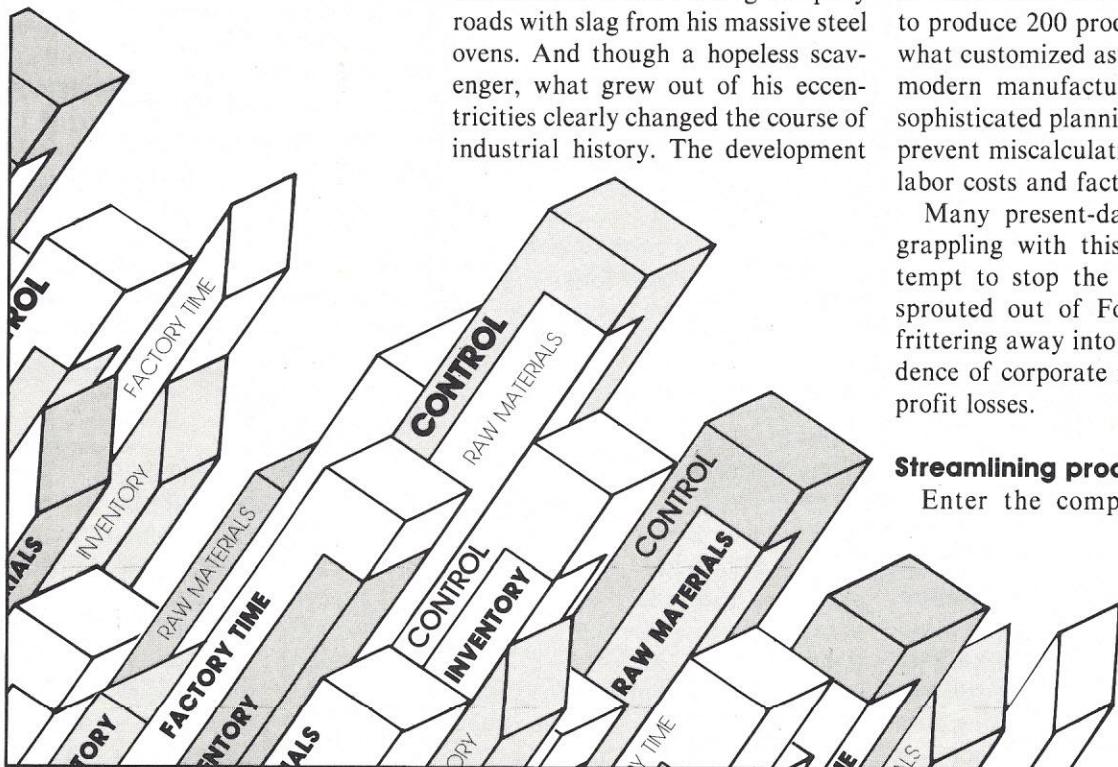
of the assembly line, Ford thought, would finally tame the wildcat entropy he saw endemic in large-scale manufacturing.

Over the years an array of sophisticated tooling methods have sprung from the example provided by Ford's early automobile plants. But the process of creating many finished products out of simultaneously molding large amounts of raw materials, while still the only god to pray to on the nation's Factory Row, has become more and more difficult—especially during the current era of increasingly complex factory orders and equally inventive designs.

It is a problem with which the old-fashioned craftsman never had to contend. He made one product at a time by taking a certain number of parts and shaping them together in a procedure that took a certain number of man-hours. But if 12 workers are to produce 200 products, each somewhat customized as is the case in the modern manufacturing plant, more sophisticated planning is necessary to prevent miscalculations in inventory, labor costs and factory time.

Many present-day managers are grappling with this issue in an attempt to stop the efficiencies that sprouted out of Ford's seeds from frittering away into the ultimate evidence of corporate inefficiency—job profit losses.

Streamlining production
Enter the computer. Recently,



company leaders have been touting the computer as a way of streamlining the mass-production process. Up to now this manufacturing improvement, considered complicated to achieve, has been strictly provided by large mainframes, and thus out of the price range and data-processing abilities of many smaller- and middle-level firms.

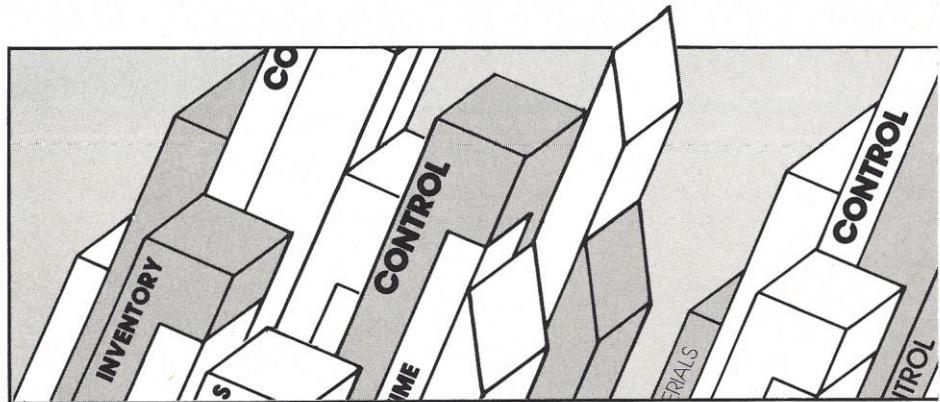
These small-businesses, often already in losing skirmishes with their multimillion-dollar competitors, saw the introduction of the mainframe into the factory as another example of the rich getting richer and the poorer watching. That is, until recently with the emergence of the personal computer.

While it is just a fledgling cottage industry, a few personal-computer manufacturers and software houses, encouraged by an obviously large market among smaller businesses—and larger firms looking to decentralize operations—are shifting their attention to the factory of the future. And although personal-computer implants in manufacturing shops are still relatively rare, the results, when they have been tried, show that a pattern of success is already emerging.

Keeping secrets

A diverse corporate group has begun to turn over its factory data and tooling secrets to desktop machines. Pulp mills. High-technology design shops. Heavy metal plants. Names such as Apple Computer, Pepperidge Farm and Johns-Manville.

Waltham, Mass., smack in the middle of an area that could be dubbed Silicon Valley East were it not for the staunch ethnocentrism of New Englanders, is no stranger to the current "smaller is more beautiful" era in high-technology. The mini-computer came of age in these hills. So perhaps it is fitting that the first real attempt at manufacturing with the personal computer took place in an



engine parts factory five years ago.

Standard Thompson, a division of the Pittsburgh conglomerate Allegheny and Ludlow and the world's largest manufacturer of car and truck thermostats, purchased a Cromemco system in early 1977, after company officials grew tired of watching revenues dissipate in poor raw material procurement for major jobs.

To guard against total failure of the manufacturing process, Standard Thompson, before 1977, had resorted to an inefficient procedure all too common in corporate life: massive overbuying and overstocking of raw materials, which causes inventory costs to skyrocket. Even this often failed to ensure that the factory worked smoothly.

"All of a sudden, anywhere in the assembly procedure, you can find out that some part is missing or has run out, or that somebody forgot to place an order for that part," Peter Langford, materials manager at Standard Thompson says. "And in our business where shipping movements are very dynamic, it could be a pretty agonizing job trying to catch up after you fall behind."

Langford says that before the Cromemco arrived, a large job, such as making hundreds of aircraft thermostatic controls used to gauge the temperature of the fuel as it is dispensed, which employs 30 workers and has a lead time of 30 to 34 weeks, was frequently off the targeted com-

pletion period by as many as three to six months.

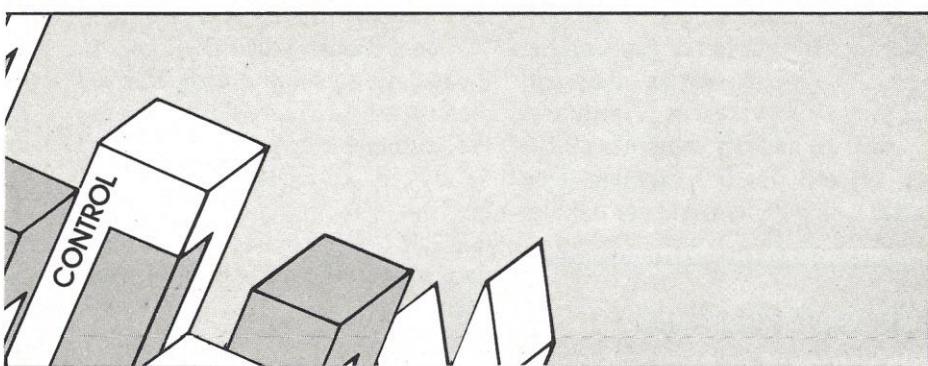
With the implementation of the Cromemco, Standard Thompson's assembly line has been brought under control—the manufacturing time line no longer overruns its goal set at the beginning of a job.

According to Langford, who oversees the operation of the computer, a massive data base has been loaded into the Cromemco, a sort of company-manufacturing history, to orient the machine to the needs of Standard Thompson.

Now at the beginning of a job the quantity of end products needed and the customer's due date is entered into the computer. The Cromemco sorts the new data, comparing it to production rates and man-hour requirements already in its memory bank, and generates a schedule, plus an overall bill of raw materials required. This materials list is then re-entered into the computer where it is "exploded" into costs and amounts of the parts that have to be purchased for the job.

Nationwide planning

Langford says that the personal computer—even in the most comprehensive toolings which have as many as 12 successively complicated manufacturing levels—has been accurate and made the assembly line a joy to work with again. He adds that the Cromemco's success has led officials at Standard Thompson's parent com-



pany in Pittsburgh to look towards factory planning on a nationwide basis at the corporate level, a massive undertaking that will require large mainframes.

"That was apparently always the overall game plan," he says. "The use of the Cromemco in Waltham has been a good stepping stone because it established computer discipline, allowing the production people to get used to the machines. It also brought the computers in-house where they can be used for purposes other than manufacturing."

Standard Thompson broke important ground in bringing the personal computer into the factory, but it was possible only because the company was financially able to dedicate numerous man-hours and millions of dollars in creating the complicated programs and nurturing their implementation.

For smaller firms, these costs and time appear to be prohibitive. However, in San Diego, Calif., two firms in tandem are attacking this problem and appear to have succeeded in making the future something that will be available across all levels of corporations.

Into the 21st century

Dennis Clark, a vice-president at KW Engineering which makes custom radio-frequency microwave products, got the ball rolling four years ago when he hired Jeff

Comport, a local software consultant, to help develop a system for KW's factory line.

"I realized that the only way small companies could project themselves into the 21st century was through computerization over all levels of their operations," Clark says. "And if you don't have your manufacturing controlled by computer, as well as all your other priorities such as accounting, sales, etc., you're simply not going to make it. The real key to small-business computer use is that you can store specialized knowledge and never lose it. This has to be expanded to factory knowledge as well."

The way KW is using the personal computer—in its case the system is based on two Altos machines redundantly aligned—is not unlike Standard Thompson's setup. A data base of past manufacturing history is programmed into the system's memory and the computer does the rest. It produces a printout that contains a bill of materials, man-hours needed, time-frame, inventory costs and a design.

Clark's enthusiasm for the way the system has operated echoes that of Standard Thompson's Langford. Perhaps the greatest enhancement that KW has been able to accomplish, especially for an advanced electronics firm, is making the personal computer a part of the design team.

"We used to need 20 forms to handle 20 jobs," Clark says. "We were always expediting and de-expediting

or calling a customer and saying we wouldn't be ready on time. Every job would be one week to six weeks late. Before we were never able to optimize the use of a design. We would finish it and move onto another job. Now, with the computer keeping track of minute details of the designing, we are able to apply many of the same drawing-board concepts to similar jobs."

Although KW's success is impressive, it is what has emerged from it that has enhanced the potential for bringing the personal computer into the factory. After presiding over the computer implantation at KW, Comport set out to develop the first all-purpose standardized manufacturing-software package for use in personal computers.

Today Comport's San Diego-based firm, Decisions Methods, Inc. (DMI), provides consultants and system design—including the DMI software—to firms wanting to bring a small, thinking machine into their factories.

"We realize that most companies that have the inclination to use a small computer in their manufacturing process do not have the know-how, the money or the time to be involved in the long haul of implementation," Comport says. "In general, the stickiest problem in this issue is the lack of programs. Up to now everybody has had to go out and reinvent the wheel for their own needs. The magnitude of this problem is huge."

An old wive's tale

Comport says that when it became apparent that the old idea of customizing a program for each factory was akin to an old wive's tale, the concept of standardization became a more palatable notion. "There really is no need for customizing in this regard," he says. "The manufacturing process for everybody is essentially the same. You take raw materials and create a

product from them. What we are doing, as with all computer programs, is helping companies manage a timeworn process." Comport adds that the only customized aspects of DMI's programs are in paper procedures that need to be tailored to the

"It may sound simple to an outsider, but it's not to the guy working inside," says Rick Parker, pulp-mill project supervisor at Longview. "Before we had our computer all the worker had was a residual oxygen meter which really could not tell him

least according to KW's Clark. "When a company like DMI goes to a customer to setup a computerized factory, it has to move slowly because the customer can get MRP shock," he says, based on the experience at his firm. "To the customer it looks like DMI is just going in there and taking over the very guts of their operations."

"The only way small companies can project themselves into the 21st century is through computerization over all levels of their operations."

individual corporation's filing habits, such as special forms and reports.

In the Northwestern lumber regions of Oregon and Washington, massive paper mills toss acrid sulfuric odors into the cold, wet air, while inside, the factories' furnaces eat a carefully balanced recipe of chemicals to achieve defined conditions for cooking the pulp. The ovens' requirements are tedious and exacting. Deviations have been known to unravel the process.

Until recently feeding the furnaces was done entirely by hand, and luck, at times, was the only partner on which the mill operator could count. Now, in some plants, the personal computer is being used as a supervisory instrument to control the pulping fire.

One of the latest milling companies to join the bandwagon—but already able to quantify its success in dollars—is Longview Fiber, a liner bond and paper bag manufacturer in Washington. Last year Longview purchased an Apple computer because the company was not able to put a lid on costly inefficiencies resulting from the wrong mixture of oxygen and cooking chemicals such as sulfur.

enough about the furnace's needs. Now the Apple gives the operator advice as to what the exact air and fuel ratio should be."

Parker says that Longview auditors have estimated that the company could expect \$100,000 in annual savings for each percent of excess oxygen it shaved off. "We used to average 4 1/2 percent excess oxygen and now with the use of the Apple we're down to 2 to 3 1/2 percent in excess," he adds. "That means we've saved anywhere from \$100,000 to \$200,000 already this year. It clearly more than pays for the computer."

While no plan is in the works as yet, Longview officials would like to expand the use of the personal computer to other furnace operations. Larger mills, they point out, are using computers for setting up milling points and controls, another inexact manual process.

From new conceptions in high-technology, acronyms are always born. So it is with computerized manufacturing which has been dubbed MRP, for material requirements planning. In this case with the birth of the acronym and what it stands for, a whole new psychological syndrome appears to have emerged, at

Suspicions arise

Actually there is some truth to the suspicions of the customer firms. Overhauling a time-tested, if somewhat inefficient, manufacturing system—especially for smaller companies—could make a corporation financially vulnerable if the new process fails. Considering the number of suits because of computer blips in other fields that led to bankruptcies—Burroughs, for instance, is a defendant in numerous court cases—a firm changing over to the factory of the future has a right to be skeptical.

Comport of DMI agrees that the stakes are high—"KW would clearly be very sensitive to hardware failures," he says, "because they really don't have the capabilities to build much manually anymore"—but he adds that his company attempts to give sophisticated consultancy to guard against systems that won't work.

"I think the critical thing we try to teach companies, especially those that can't afford twin computers, one to back up the other, is to back up their information often into reliable memory systems," Comport says. "That way even if a failure occurs in the hardware, they don't have to start all over each time they get back online. I'd like to add that if we see a company that wants an application that simply won't fly we have to have enough integrity, whatever it costs us, to not sell it to them. I hope other firms coming into this business follow that line."





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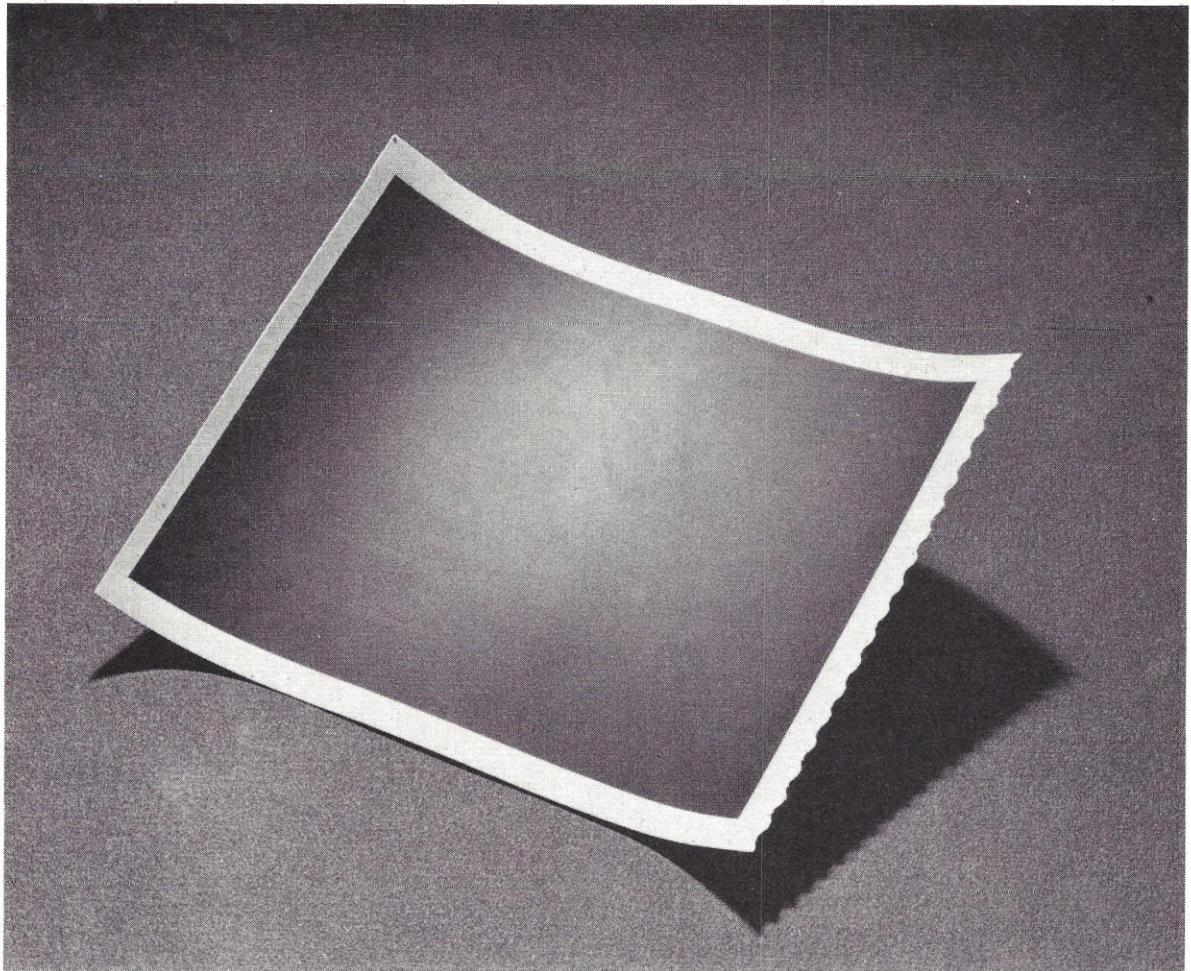
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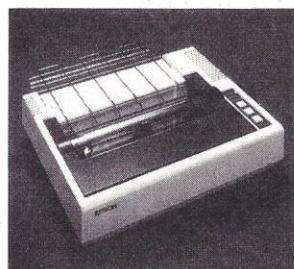
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CIRCLE 12

LEISURE COMPUTING

Are the stars out tonight?

You won't have to check if it's cloudy or bright if you fire up your personal computer

It wasn't too long ago that everyone *knew* that the earth was the center of the universe. Now only "flat earthers" and others of that ilk feel that way. We still have the idea that our solar system is somehow the center of things, and that all the cosmos is there for our benefit.

There is probably nothing farther from the truth. Our solar system is only a small part of a huge galaxy, located in one of the spiral arms of

the Milky Way, nowhere near the center. To say nothing of the fact that the Milky Way is only one of a number of galaxies we've been able to identify in the universe, and it's not a particularly big one at that.

The geocentric view of the universe held sway until the advent of the telescope and the scientific method. Then the world view was reoriented to the idea that the earth was not the center of the universe, let alone the center of the solar system.

By 1838, Friedrich Bessel had discovered that over the period of a year a faint star called 61 Cygni moved in a circle—because as the earth completed a circuit in its orbit, a close star, in this case 61 Cygni, moved relative to the farther background stars. This discovery conclusively proved that stars are located in three-dimensional space at various points in the universe.

Constellations, which before were thought to have great significance,

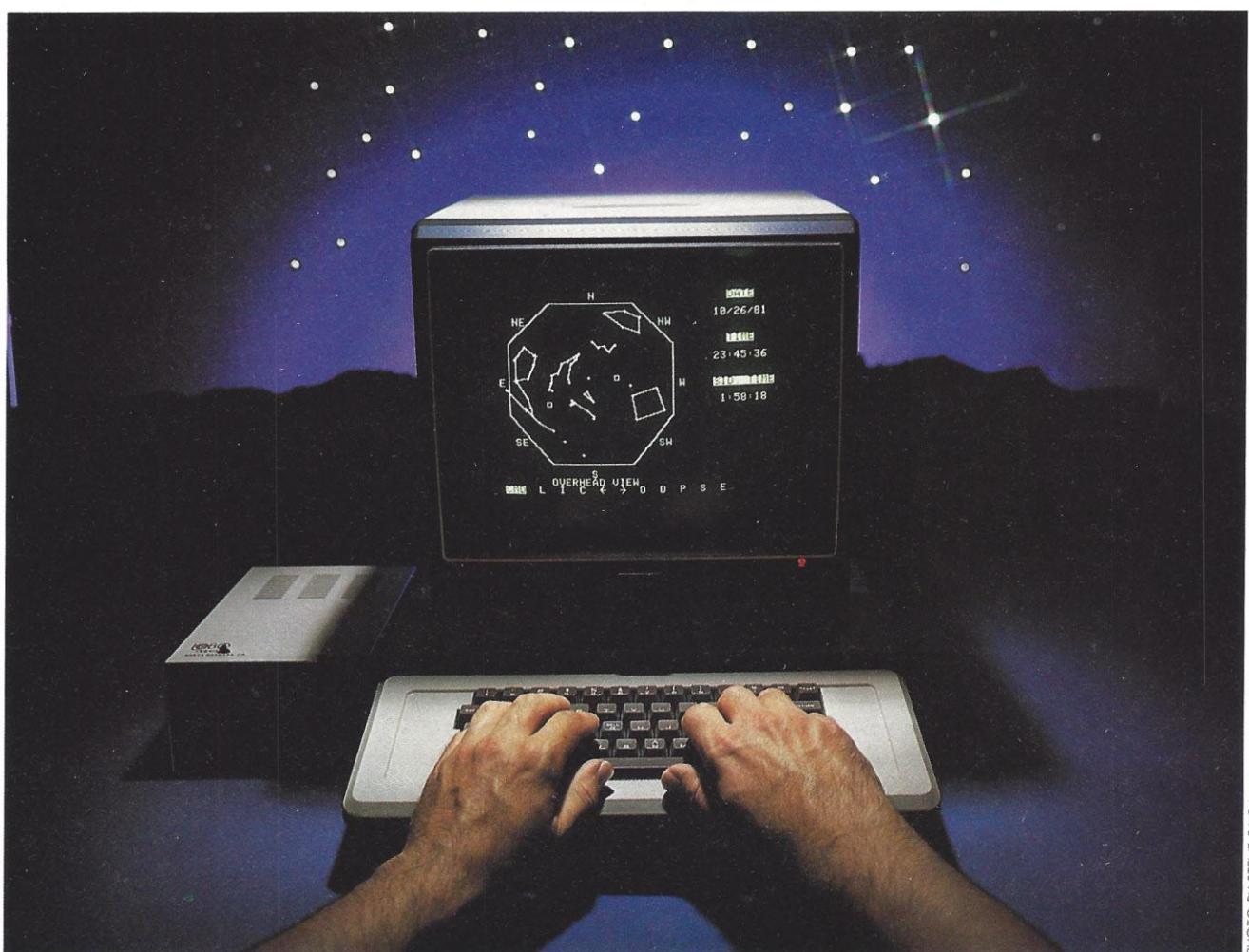


PHOTO BY STEVE SAGALA

now were used as symbolic subdivisions in the sky. But constellations still played a large role in the thinking of the average man, since the parallax, or the position change a star makes over a year, is slight—.78 second of arc. So, the average person still regarded the star as fixed at a great distance.

To give a person a feel for the sky, astronomers drew star maps. These maps were projections of star positions as they appeared in the sky. Visible stars are plotted by their declination and right ascension.

Declination is the distance in degrees from the ecliptic, the path the sun follows in the sky. The earth, sun and the ecliptic can be put in one plane, the plane of the ecliptic. The stars above the ecliptic have positive declinations and are in the northern sky. Those below it have negative declinations and are in the southern sky. Each star has a declination lying between plus and minus 90 degrees.

Stars also have right ascensions. Every hour the sun appears to move $1/24$ th of the way around the earth (actually, the earth turns $1/24$ th of the way around its axis). So the right ascension measures 24 equal divisions of the ecliptic, logically called hours. These are further divided into minutes and seconds, $1/60$ th and $1/3600$ th of an hour of right ascension, respectively. The sky is thus made up of an imaginary grid, and any point can be found by knowing its declination, measured in degrees, minutes and seconds; and right ascension, measured in hours, minutes and seconds.

Many textbooks and almanacs contain listings of stars along with their declinations, right ascensions, distances and other information. The distance is usually given in light years—the distance light moves in one year—or parsecs—the distance at which a star would have to be located for it to subtend one second of

arc over the course of one year.

Fairly precise determinations of distances are known for some 6000 stars. Right ascension can be converted to degrees by the simple formula: $RA(\text{degrees}) = RA(\text{hours}) \times 15 + RA(\text{minutes}) + RA(\text{seconds})$. Thus, $16^h 0^m 0^s = 240^\circ 0' 0''$. If a star's distance is given in parsecs, it can be converted to light years by the formula $D(\text{light years}) = 3.28 \times D(\text{parsecs})$.

So far, a star's position has been described in terms of three numbers. But the description is that of the location of the star as seen from the earth. A computer let's us move off the earth to see what the stars would look like from some other location—places as far away as the largest number our computer can handle.

The program that appears in this issue will do just that.

Converting data

The process begins with the conversion of position data, which is in spherical coordinates, to cartesian coordinates. To get to these familiar xyz coordinates, use the equations:

$$x = r \cos \phi \cos \theta$$
$$y = r \cos \phi \sin \theta$$
$$z = r \sin \phi$$

In these equations, r is the distance to a point, in this case the star; ϕ is the declination in degrees; and θ is the right ascension, also in degrees. After inserting the values in the proper equations, the star's position with respect to earth (or the sun, the difference is inconsequential), is in cartesian coordinates.

These numbers can be rewritten in the form: $\vec{R} = x\vec{i} + y\vec{j} + z\vec{k}$ where \vec{R} is a vector whose components (x, y and z) describe it; \vec{i}, \vec{j} and \vec{k} are the unit vectors, vectors of length and direction x, y, z .

This equation is a powerful tool for solving the problem of space relationships. Suppose the spherical coordinates for star A and star B are

known. Vectors \vec{A} and \vec{B} corresponding to the stars' location with respect to the sun can then be found using the preceding equations.

By performing vector subtraction, a vector corresponding to the direction and distance of star B as seen from star A can be derived. In fact, B needn't be a star—it can be any point in the universe that can be described by a vector. Vector subtraction (or addition) is easily performed by the equation:

$$\vec{C} = \vec{B} - \vec{A} = (B_x - A_x)\vec{i} + (B_y - A_y)\vec{j} + (B_z - A_z)\vec{k}$$

It is also easy to see that the direction of A as seen from B can be obtained by multiplying the equation by -1 .

And from the earth...

Have you ever looked up to the heavens on a clear summer night and recited, "Twinkle, twinkle little star, how I wonder where you are?"

If you've ever questioned which stars and planets are visible on a given day or night, IUS has an answer—TellStar.

The program is billed as, "your computer window to the celestial objects as they appear at your home, or at any location on the earth you desire." It is available for the Apple personal computer and includes appendices containing city locations in terms of longitude and latitude, along with a variety of star tables.

TellStar consists of four main sections: viewing location, viewing time and date, display and calculation.

The program first greets the user with a request to choose a standard, random or new viewing location. Any city in the

This newly derived vector can be disassembled back to its cartesian (x,y,z) coordinates, and these can be converted back to spherical coordinates by the following equations:

$$R = x^2 + y^2 + z^2$$
$$\phi = \arctan(z / (x^2 + y^2))$$
$$\theta = \arctan(y/x)$$

In these equations, $x^2 + y^2 \neq 0$ and $x \neq \theta$ for the solutions of these equations to exist.

From the mathematical discussion a point of reference can be moved from the earth to somewhere near B, providing the locations of A and B are known.

To find these locations and perform calculations, the program is

world can be chosen, providing the user can give its longitudinal and latitudinal location.

The next section asks the user to specify a particular date and time of viewing. A series of statistical data about the chosen location, date and time is then presented on the screen.

The display section of the program contains high-resolution graphic representations of the celestial objects present in the sky at the requested location, date and time.

The calculation section provides a series of astronomical calculation utilities. These routines can be very valuable to amateur astronomers.

TellStar's accuracy depends upon the celestial object in question. Accuracy is typically within 15 seconds of arc, but may vary up to several minutes at the extremes.

Star light, star bright

TellStar has been written to minimize the need to remember facts and figures. The program requires that the user enter his

used. Ordinarily, even with a programmable calculator, the process of getting these numbers would be difficult. With a personal computer these steps can be performed in a fraction of a second.

The listing's data statements contain the spherical coordinates, converted to decimal degrees, for 93 stars and 44 other objects. The program prompts the user for the coordinates of a star and then computes and plots these points as they would appear from that star.

Star gazing

The program allows the user to either use a known star or pick a point

"standard" viewing location only once, using data from the World Wide Cities appendix.

As an example, consider the viewing location of San Francisco. The program prompts the user to enter the location's latitude in degrees, minutes and seconds, and its hemisphere. San Francisco's latitude is 37 degrees, 46 minutes, 35 seconds, and it is in the northern hemisphere. The program then asks for the location's longitude—122 degrees, 24 minutes, 40 seconds, and it is in the western hemisphere.

The next question the user encounters concerns viewing time in hours, minutes and seconds, and whether or not the user wishes daylight savings time. The date is then entered, including month, day and year.

After the input is complete, the user is ready to let TellStar show its stuff. The display command loads the display section of the program. There are status messages describing the various processes taking place, such as initial planetary calcu-

lations, outer planet calculations and the earth's orbital position.

A picture is worth...

TellStar has two display modes, horizontal and overhead. Horizontal presents a view covering 90 degrees of azimuth (an arc of the horizon measured between a fixed point and the vertical circle passing through the center of an object), and from the horizon to straight overhead (the zenith, the highest point reached in the heavens by a celestial body). The overhead view displays 360 degrees of azimuth from the zenith down to 40 degrees of elevation.

Within the display mode the user can request the location of any object in the star tables, identify objects on the screen, draw lines between stars to show a life-like view of the constellations in the sky and shift the horizontal display to either the left or the right. The user may also save the views and data and print the graphics to a Silentype printer.

RETURN causes the program to proceed to the next question. If you input the name of a constellation, then the name is stored for later use.

The next prompt is a request for the point from which you wish to view the star chart. The star you enter is your vantage point, and you see a map of the stars from the star whose name and coordinates you entered.

If you name your vantage point as SUN, the program returns the star map as seen from earth. Entering SUN simply makes the program go to a subroutine that plots each of the data points in the data list. The plotting in this case is much faster than it is if you enter a different star for a vantage point, since no calculations are involved in plotting the star map as seen from the sun.

Constellation plotting

In any case, if you want to see a particular constellation, and input SUN as the observation point, all the stars in the data list are plotted. If you input a specific constellation and

The galactic equator as shown on the display is actually an imaginary configuration of 24 points situated on the rim of the galaxy. The points are over 80,000 light years from the galactic center or nucleus. For distances of 1000 light years or less, the curve formed by these points appears fixed. At greater distances, the curve begins to resemble an ellipse.

There is also a set of imaginary points corresponding to the nucleus. The two small polygons in the lower right-hand corner represent the Large and Small Magellanic Clouds, the Milky Way Galaxy's nearest neighbors. The Andromeda Galaxy is plotted in the upper right-hand quadrant. These galaxies are from 500,000 to 2,000,000 light years from earth. Except from great distances, these also appear fixed.

As you increase the distance from earth, the star pattern gets progressively more distorted. Notice that most, but not all, of the stars become bunched in a small patch of the sky. This occurs because many

The distance can be increased to as large as Applesoft can handle. For small distances, only the positions of the nearby stars are affected. As the distances increase the distinct bunching takes place. The Milky Way Galaxy is composed of 100,000,000,000 stars, but only an infinitesimal fraction of the member stars are used in the program, giving the false impression that the galaxy is empty.

To examine the spatial relationship of the neighboring galaxies, distances of in excess of 1,000,000 light years must be used. The stars at this distance are then confined to a single point on the rim of the galaxy.

As you work with the program, you will find that it can be modified in several different ways. The stars are represented by simple points in high-resolution graphics. Stars can be classified according to their brightness or magnitude. Magnitude, specifically relative magnitude, is a function of a star's intrinsic brightness and the distance from the star to the viewer. The user may wish to enlarge his data set by including the star's intrinsic magnitude.

The equation that produces the star's relative magnitude can be added to the program in the form of a subroutine, but this would increase the running time of the program. A SHAPE table could then be used to represent the magnitudes of the stars as they are seen from earth or any other point in the sky.

Another modification would be to expand the data set by adding more stars to the list. Distances are fairly accurately known for 6000 stars, and all of these could be added to the list at the expense of run time and increasing screen clutter.

Users can also change the coordinate system from the earth-based cartesian system to one based upon the galactic-coordinate system or maybe even a polar plot.

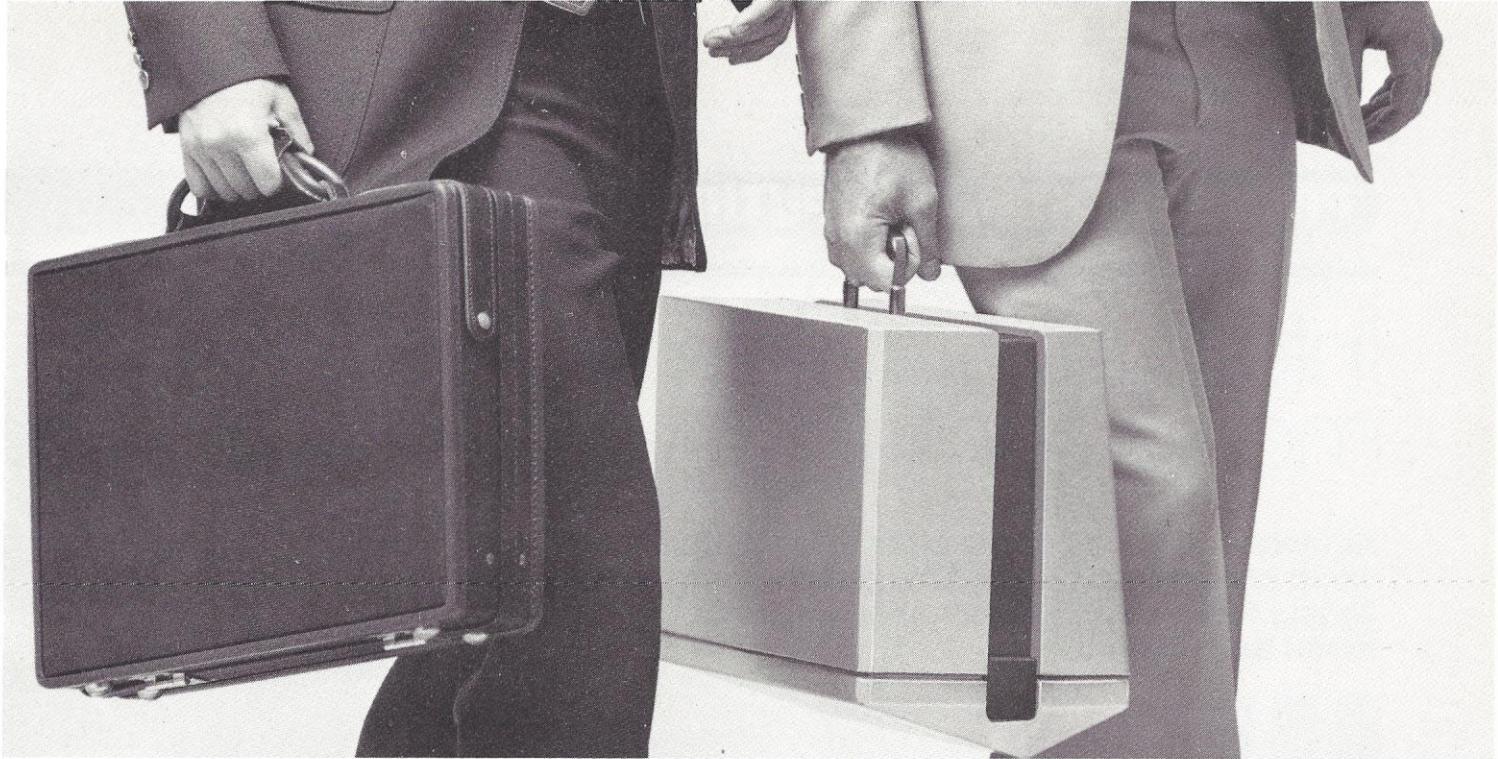
"A computer lets us move off the earth to see what the stars would look like from some other location."

ask for a different vantage point, only the specific constellation you asked for is computed and plotted. This speeds the plotting from a distant observation point.

When you plot the star map as seen from earth, notice that a sinusoidal line is drawn. The middle line is the ecliptic, the path the sun takes through the sky. But there is another equator that astronomers commonly use called the galactic equator. This is the center line of the galaxy and it's tilted to the ecliptic, hence it appears as a sinusoidal line.

these stars are bright simply because they are relatively near the earth. Other stars appear not to move as much. These are the intrinsically bright stars.

As you move your perspective outward, notice that the stars local to the sun appear to lie in a flattened oval whose major axis is near the curve-shaped galactic equator. These stars lie in a small part of the galaxy. Therefore, the stars "flesh out" a small part of the display and take the galaxy's shape, which is an extremely flattened disk.



The guy on the left doesn't stand a chance.

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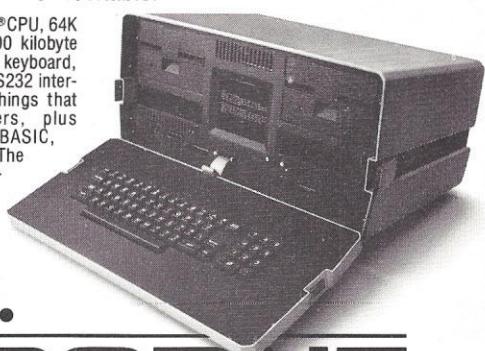
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Intelligent investment management by computer

As more and more people enter the fast-paced world of high-finance, investment managers are finding that a personal computer can be a man's best friend

What enters your mind when you think of the stock market? A huge room full of distraught and delirious people shuffling through little scraps of paper strewn all over the floor? Men and women in expensive tailored suits wheeling and dealing on the phone? Huddles of people gathered around a florescent display eagerly awaiting the next

flash of the board?

Or do your thoughts turn more towards a small, quiet office away from the clamor on Wall Street—a place where business is handled using a phone and a personal computer?

Now that the stock market is wired, professional investment managers are turning the personal computer into a tool of their trade. Managing investments consists of purchasing such things as com-

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modities, stocks and bonds at a low rate with the anticipation of selling them later at a significantly higher price. Decisions about what to buy and when, and then when to sell have critical financial consequences.

There are currently four areas of investment management in which the use of personal computers is evident: portfolio monitoring, price watching, technical analysis and fundamental analysis.

Fruit salad

A stockbroker who manages portfolios for his clients must deal with hundreds of securities at a time. For instance, John Appel, a broker with Thompson McKenna in Florida, handled 98 portfolios and 340 securities in a six-month period.

"I use the Pear program on my Apple computer to keep from going bananas," Appel says. "Any broker can tell you that the need to cross index and keep track of splits makes recordkeeping a real pain. I've been a broker for 27 years and the books were always a mess. This Pear/Apple combination keeps my records accurate, legible and up to date. I can also write letters with my word processor, do selected mailings to my clients and take it home on weekends to do the bowling scores."

The Pear program was designed by stockbrokers for stockbrokers. It has a master-security file that accommodates up to 500 entries of almost any sort: common stock, a limited partnership or even cash. Only commodities cannot be computed.

"Of the 200 Pear systems now in use, about 60 percent are being used by brokers, another 30 percent by investment advisors and the remaining 10 percent by other users," says Lenore Salsburn, president of Pear Systems.

"One of the interesting things we're hearing from brokers is that the system gives them a distinct edge on their competition," Salsburn states.

She cites the example of a broker who offered to track securities for another broker's client. The client was so impressed by the updated information that he transferred his entire portfolio to the broker who used the Pear program.

There are other portfolio-management systems available, in-

"I use the Pear program on my Apple computer to keep from going bananas."

cluding Apple Computer's Portfolio Evaluator which analyzes each of up to 50 stocks and provides summaries of short- and long-term gains and losses as well as current portfolio value and shares held. The user can also tap into the Dow Jones data base and receive current prices with a time lag of about 20 minutes.

Radio Shack offers Stockpak, a stand-alone portfolio-management system in which users type in the stock prices. They can also tap into Standard and Poor's monthly common-stock data service. A diskette and a newsletter provide about 30 items of current data on approximately 900 common stocks. Users can compare the performance of stocks against any other selected group in the Standard and Poor's file.

Ticker tape parade

Another advantage personal computers provide for the professional dealing with the market involves price watching. Monitoring stock prices is essential in determining when to buy, what to buy and when to sell.

"We live in an information economy where 50 percent of the gross national product has to do with moving information," says Tony Morris, president of Morris Decision Systems. "In the financial community,

keeping on top of the data or coming up with a unique insight can mean a lot of money. I see the personal computer as a key tool that can unlock the individual productivity and creativity of the professional investor dealing with the information economy."

"It's like Mark Twain said," Morris states, "When everybody is digging for gold, it's good to be in the pick and shovel business."

Max Ule and Company in New York is also in the price-watching business, providing what *Fortune* magazine has called a "tapewatchers delight." The system, called Tickertec, is designed to monitor prices of 400 stocks on the American or the New York Stock Exchanges. It will flag prices when they hit a previously determined buy-or-sell level, but it does not make calculations. Quotes are piped in via a Western Union low-speed ticker tape.

Tickertec will work on various personal computers including those from Radio Shack, Cromemco, Vector Graphic and North Star. Of the 60 people presently using Tickertec, approximately one-third are investment advisors, according to Ule.

Another price-watching system comes from First Flight Data Systems in Kitty Hawk, N.C. The Monitor, similar to Tickertec, is an on-line system that works with the Apple personal computer. There are presently 30 packages in use, about half of them by professional investors.

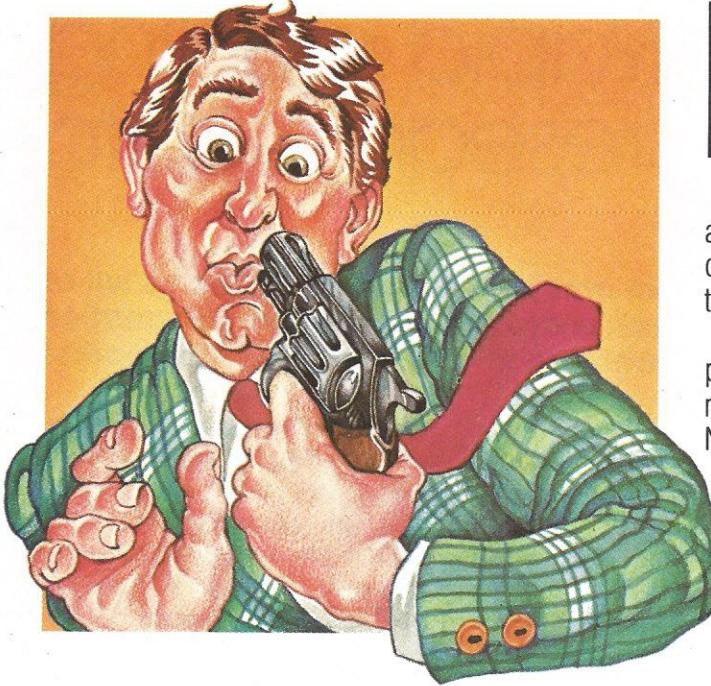
Place your bets

Earl Reiback, a professional commodities trader, makes buying and selling decisions based on "The Reiback Ratio," a technical method he developed for evaluating the success of a trading system based on actual trading possibilities.

"With my personal computer I can complete, in four or five hours, what

continued on page 98

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CIRCLE 47

Rapid reading of research data

Personal computers are turning rooms full of mainframe data into digestible information you can use in characterizing that market

The giant computers at Epsilon Data Management, just north of Boston, run day and night to keep up with the market data flooding in from the company's direct-mail marketing clients. Programmers and computer operators work the company's giant Hewlett Packard and Itel computers, spinning out mountains of statistical market-research data on miles of computer printouts. The company directs nationwide mailings mainly for non-profit organizations, like the Cousteau Society, relying on its computer-powered research capabilities to target those individuals most likely to give money.

From its large computers, the company generates dozens of client market reports which detail the effectiveness of one mailing or another, evaluate and analyze the responses to the marketing efforts and pinpoint areas of future marketing potential. The amount of market segmentation and flexibility in direct-marketing mailings that Epsilon can achieve through its use of the computer has

become almost legendary. Its information gathering and market-research capabilities are stunning.

But when Epsilon Data Management clients want to understand exactly what is going on with their accounts, the company's account executives turn on their Apple computer. "We use it to explain all the statistics to the clients," says Susan Eichman, an account supervisor who has been a leader in using the Apples at Epsilon.

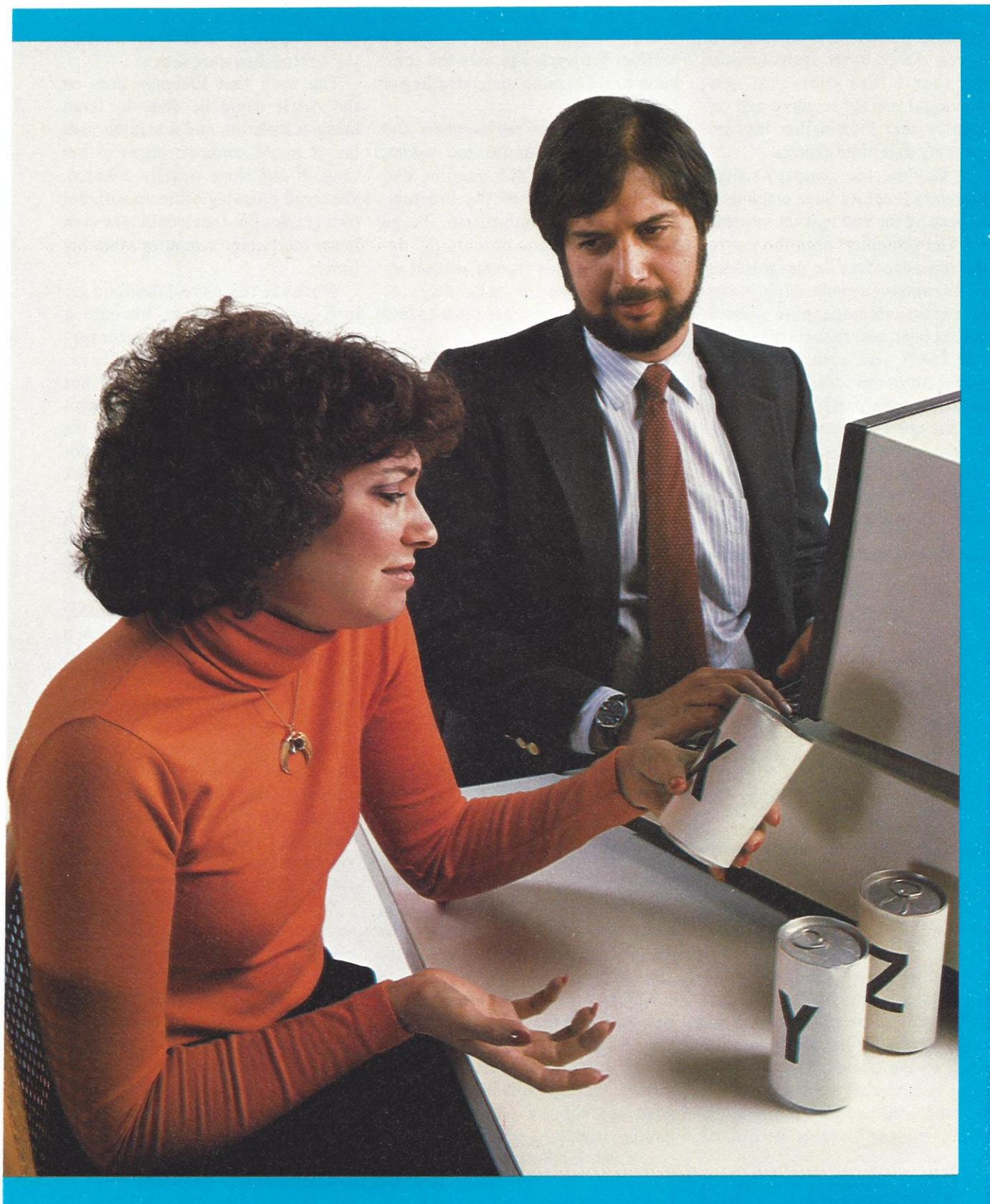
While relatively few marketing companies have developed the computer capabilities that Epsilon commands, more and more companies are discovering that personal computers have a distinct role to play in market research, although the companies may still rely on full-powered, large computers to handle the bulk of the number crunching, statistical computation and analysis. While the large computers with their massive memory capabilities and high speed are still required to handle the bulk of most market research, personal computers are beginning to shine when it comes to rapid evaluation of data.

There are four parts to most market researching: gathering the raw material, processing it, evaluating the results and turning the results into a meaningful plan or report that can be acted upon. It is in the final two stages, evaluating and reporting, that personal computers are showing the most immediate applications.

Although there are some small statistical programs for personal computers, the machines are generally not powerful enough to handle large amounts of raw data: The memory is too small and the programs are too slow. Epsilon's computers will sift through the results of mailings to millions of people, sorting out dozens of different categories of response—something the personal computers simply can't handle.

Digesting the data

However, using VisiCalc and similar programs and improvising with list-management and word-processing programs allows personal computers to sort, analyze and evaluate the market data that is being generated by the large statistical



computers. Relying on primary and secondary research from a variety of sources, the personal computers can turn that information into new, meaningful market research and can assemble that information into immediately digestible reports.

At Epsilon, the company's main computers generate huge amounts of statistical data and market information. The computers scan the market research according to geographical considerations (regions, cities, states, zip codes), demographic considerations (age, sex, education level, income level), and even by recipient history (how the individual has responded in the past). The result is that Eichman's clients end up with "quite a few numbers from many reports." The clients are often overwhelmed. They are often untrained in market research and evaluation, and

pretty, simple graphics. Working mainly with the VisiCalc and VisiPlot software, she uses the computer to aid her own understanding of the numbers.

Eichman inputs the numbers and assigns the coordinates and values, prodded along by the question and answer prompting of the program. The results are immediate. To go back to the data-processing department for this type of market information would take days or weeks—if she could get them to find the time to do it at all.

VisiCalc and similar software packages don't do the market research for you, notes Eichman's assistant. Just as the large computers must be fed the raw data from the field, so the personal computers need the data generated by the large computers. The user must then assign the

"if" conjectures using VisiCalc, projecting results if different marketing approaches were taken.

The work that Eichman does on the Apple could be done by hand using calculators and a scratch pad, but it would consume hours of her time. If she were visually oriented, she could probably come up with her own graphs, but that would take even hours more. Her computer saves her time.

While she has no real desire to get into programming or become a computer hobbyist, she finds her personal computer a valuable tool in explaining market research to her clients. It won't ever replace Epsilon's data-processing department, but the personal computer makes it easier for Eichman to use the market research that is generated.

Professional market researchers would agree with Eichman's approach. Kim Wallace of the Boston-based market-research firm of Wallace and Washburn, reports that his company sends the information it collects to outside data-processing houses where it is run through a large computer and returned to him in statistical report form. The complex statistical programs and the large amounts of materials that must be evaluated with his firm's type of market research probably requires more computer power and programming sophistication than is generally available with personal computers.

Wallace is currently running a market-research project for a magazine which uses its own stand-alone DEC personal computer with list-management programs to handle its subscriber list. Even if the magazine wanted to take the time to input the responses from thousands of surveys containing dozens of questions each and was able to get it all organized and stored on floppy disks, the magazine would still not have a program available which would do anything meaningful with the raw data. "I

"Large computers are still required to handle the bulk of market research, but personal computers are beginning to shine when it comes to rapid evaluation of the new data."

they can't really absorb it all. That's when Eichman turns to the personal computer.

Using the reports, Eichman feeds the most important numbers into the Apple II computer, which can turn the array of numbers into charts and graphs that make the numbers meaningful to the clients. "The graphics make it easy for the clients to see the otherwise complex relationships of the figures," states Eichman's assistant.

But there is much more to her use of the personal computer than just

values and determine the coordinates based on the data, essentially filling in the rows and columns provided by the software. A small familiarity with algebra is helpful.

The program allows Eichman and her clients to see the research more clearly and to analyze exactly what it means. It clarifies where the clients' money is actually coming from, for what market the client should be aiming, whether a market is growing or not and similar critical market information, she explains. In addition, she has the opportunity to play "what

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AUTOMATIC
WHAT-IF

ROW 1 (Net Sales) <--
ENTER COMMAND:

MODE=NORMAL ORDER=R/O ROW=1-50 COL=1-20

ROW	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	40 MATH:
1	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	41 ADD
2	450.0	489.5	532.4	579.0	2,050.9	42 SUBTRACT
3	200.0	220.0	242.0	266.2	928.2	43 MULTIPLY
4	300.0	350.0	400.0	450.0	1,500.0	44 DIVIDE
5	950.0	1,059.5	1,174.4	1,295.2	4,479.1	45 NEGATE
6	50.0	40.5	35.6	35.8	161.9	46 INVERSE
7	5.0	3.7	2.9	2.7	3.5	47 INTEGER
8	0.0	0.0	0.0	0.0	0.0	48 ROUND
9	0.0	0.0	0.0	0.0	0.0	49 CUMULATE
10	45.0	44.5	44.0	43.5	0.0	50 ABSOLUTE
11	0.0	0.0	0.0	0.0	0.0	51 ADD K
12	0.0	0.0	0.0	0.0	0.0	52 SUB K
13	0.0	0.0	0.0	0.0	0.0	53 MULT K
14	0.0	0.0	0.0	0.0	0.0	54 DIV K
15	0.0	0.0	0.0	0.0	0.0	55 SUM
16	0.0	0.0	0.0	0.0	0.0	56 GET
17	0.0	0.0	0.0	0.0	0.0	57 ZERO
					59	58

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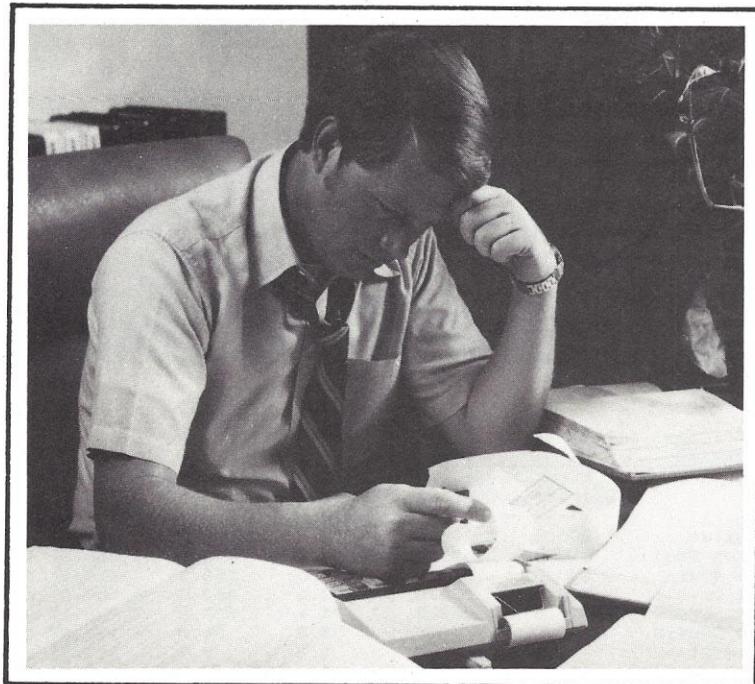
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CIRCLE 88

January 1982/Personal Computing

45

CASH FLOW PROBLEMS?



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CIRCLE 40

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would have to write the program myself," which is not likely, says the magazine's advertising sales manager who has become the unofficial computer leader at the small magazine.

"We're looking at the Apples," says Wallace. He and his partner can see a use for the machines although they expect to continue to send raw market-research data out for processing in most cases. Most likely they would use the machine in the same way that Eichman does at Epsilon, although they would probably have to alter the available programs to make it conform to their needs.

Eva Lewin, the resource development director at the Massachusetts Cultural Alliance, a trade organization made up of over 150 member cultural organizations, has a stand-alone DEC personal computer with a word processor and list management. She has a dual disk drive and letter-quality printer, a terminal for time-sharing on a mainframe and a high-speed printer. For the major statistical research and reports that her organization needs, she turns to the mainframe because it has the statistical capabilities, the memory and the speed.

Lewin uses her personal computer to take the statistical information and generate meaningful reports. She is also in the process of setting up the list-management program so that she can handle small market-research projects. Operating on a very small scale compared to Epsilon, Lewin is setting up her lists so that she can sort through the names in a variety of ways, depending upon the marketing effort she has in mind.

For example, if primary research shows that fund-raising efforts are most effective in certain select geographical areas, and through secondary research information she can match those areas to selected zip codes, Lewin could have her personal computer sift through all the names

on her lists, pulling out those from the designated zip codes to target for future fund-raising efforts. It is a very small-scale application of the type of market research that Epsilon handles on a nationwide scale.

As a graduate business student at Boston University working toward her MBA, Lewin had to take on a major market-research project for a client. Using the school's mainframe computer and a sophisticated statistical program, Lewin designed and coded the research questionnaires, inputted the response into the machine and received rows and columns of results that filled sheets of continuous-feed computer paper—the type of market research handled regularly by a firm like Wallace and

combine with her list-management program.

Different drums

Market research means something different to each person. Where Coca-Cola wants to research markets with millions of dollars in potential, a local businessman may be thinking in terms of opening a small branch office in a new neighborhood.

Either way, there are two main types of market research. Primary research is information that has been gathered directly from the field or directly from experience.

The actual results of a survey or the data derived from research from other (secondary) sources such as the U.S. Census or some state

"Using a personal computer and a VisiCalc type of program, you can combine secondary research from several sources and any primary research that you may have to create new market research for new purposes."

Washburn. Eventually Lewin found herself taping the sheets of computer paper to the walls as she analyzed all the results and prepared all the possible interpretations for her client.

Computing the raw data "is the kind of thing that mainframes do best," says Lewin, who has otherwise become excited by the potential of her organization's personal computer. For small-scale market-research projects, her personal computer will be a joy to use, but she expects to continue to rely on the time-sharing mainframe for the bulk of her statistical requirements. What she would really like is an adequate statistical-analysis program to

department or from a trade magazine is secondary market-research information.

Using a personal computer and a VisiCalc type of program, you can combine secondary research from several sources and any primary research that you may have to create new market research for new purposes. That is what Roger Sundin does for his clients.

Sundin, president of the Boston advertising agency Sundin Associates, uses his Apple II to "take primary and secondary information and evaluate it." Again, the personal computer isn't being used to generate the initial data or to statistically process

PROFESSIONAL COMPUTING

raw figures. Instead, those figures are being taken from the many publicly available sources and evaluated with the aid of the machine. The result is new market-research data addressing the immediate need of his client and new insights into the research.

For the past year Sundin has used his Apple with VisiCalc and Applesoft programs to track results

Using VisiCalc, he can enter this data, filling in the rows and columns, and begin making his comparisons and calculations in much the same way that Eichman does using the data generated from her company's data-processing department.

Getting familiar with the computer wasn't the intimidating experience that some people have found. Sundin,

"Getting familiar with the computer isn't the intimidating experience that some people have found. It is simply a matter of getting comfortable with the machine."

of the various marketing campaigns he has developed for his advertising clients. Using his computer, Sundin can study the research data, sorting it first one way and then another, testing how it affects his clients.

The type of research Sundin will do might include comparing the traffic of a bank's branch office with the demographic information of the particular locality. By comparing the population of the area to the bank's number of depositors, he can determine market penetration. By grouping the depositors by zip codes and comparing them, he can determine from which areas the bank is more likely to pull customers, where there might be room for growth or where a marketing effort may do the most good. "We can do market share, market penetration, sales potential," states Sundin.

The primary information Sundin will use is information that comes directly from the client such as customer lists, surveys and various research that the client may undertake. The secondary information is information he gets from available sources such as the U.S. Census and trade magazines.

an engineer to begin with, is fortunate to have a computer store chain, Computer City, as his client. "It is simply a matter of getting comfortable with the machine."

His other clients are becoming so impressed with the work he has generated with his machine, that many of them are considering the purchase of personal computers, "and most of them already have data-processing mini-computers," he states with considerable irony.

Distorted figures

"Figures can lie, and liars can figure" goes an old saying addressing the problem of distorting figures to prove a point. A market researcher, on the other hand, wants to evaluate the figures in as many ways as possible, trying to flush out anything helpful.

The ease with which that can be done on a personal computer cannot be matched by a large computer, even with its unchallenged statistical capabilities. Once the figures are compiled, they can be easily manipulated with a personal computer. "If we tried to do this stuff on the big computer," says Eichman's assistant,

"we'd have to sit there all night long with a programmer at our side."

Fun in the sun

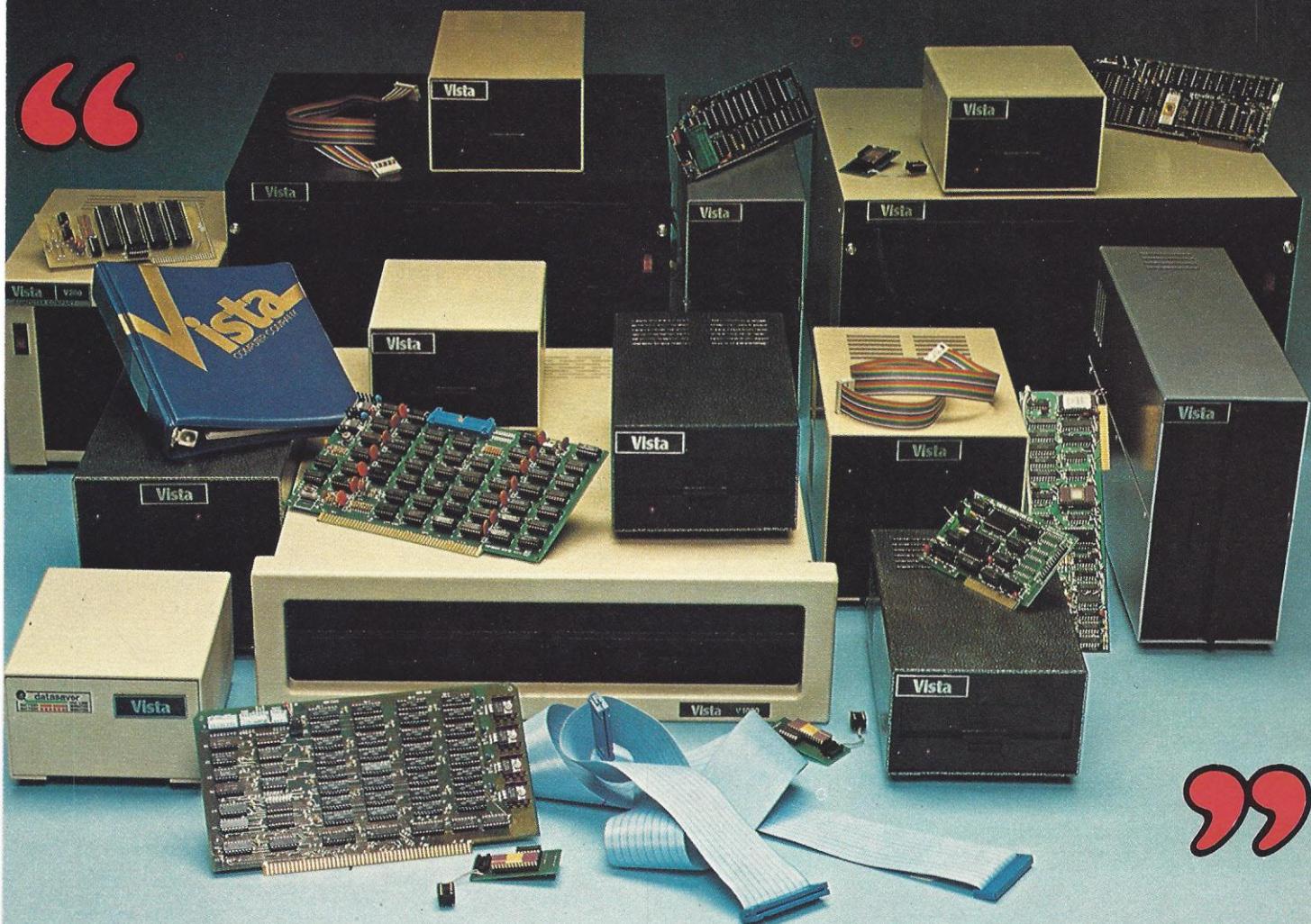
One of the most sophisticated market-research applications of a personal computer is being done, not by a marketing company, but by an accounting firm, Laventhal & Horwath. The company has a mainframe computer with a terminal in every office around the country for its data-processing needs, but when it attempts market research, it turns to its Apples.

In its most extensive application of the Apple, Laventhal & Horwath took on a market-research project involving the Department of Tourism for the Cayman Islands. This resort area southwest of Cuba had experienced an unplanned building boom and turned to Laventhal & Horwath to research a 10-year development plan for the islands. It was to be a total market-research project covering every aspect of the tourism business: How many tourists could be expected under various circumstances, how many hotel rooms would be needed, the amount of restaurant capacity, how much income would be generated for the islands and how much employment. "We looked at just about everything," said Karen Mastrobattista, who took on the project.

To begin, the company surveyed everyone concerned with tourism, including airlines, cruise-ship companies, hotels, restaurants, retail shops, bars, clubs and even the tourists themselves.

Using the Apple II and VisiCalc, Mastrobattista fed the information which had been gathered into the machine and began to project forward, selecting a variety of factors. If tourism increased by a given amount, she wondered, what would be the effect on employment? How many restaurants would be needed? How

continued on page 148



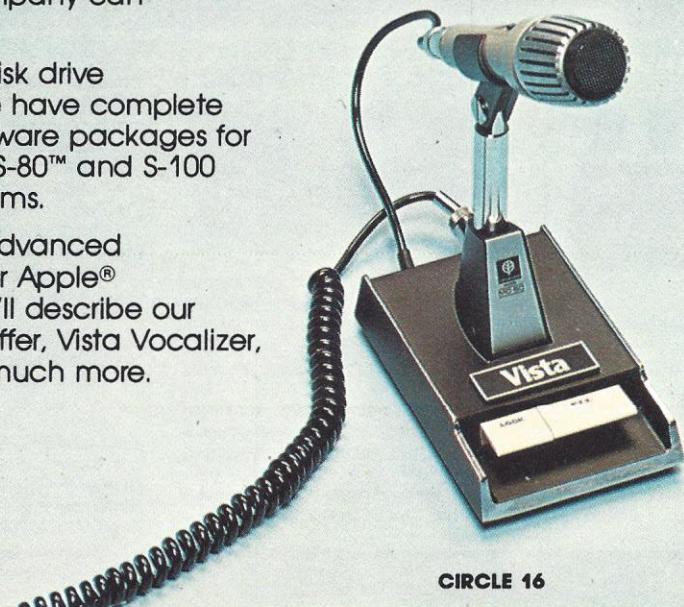
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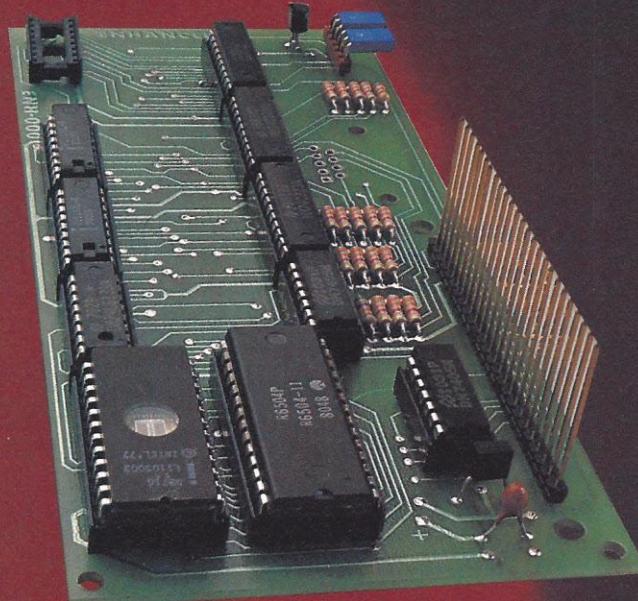
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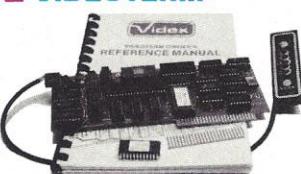
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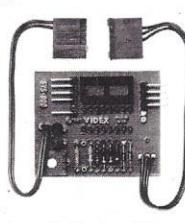
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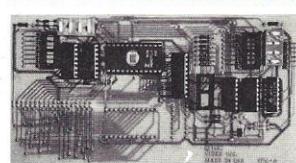
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EDUCATIONAL COMPUTING

Teach your trainees by computer

When we think of educational uses for personal computers, we automatically think of the schoolroom. But not any more. Small computers can now be used for training employees, too

Pople engaged in a small business are probably not as aware of one fact as are those in large corporations: It's very expensive to keep training people.

This isn't seen in small companies because the costs associated with the training aren't readily measurable. In smaller organizations, people are generally trained on-the-job. They learn by doing the work that they will be doing once they're fully trained. In other words, they learn by making mistakes and correcting their errors. The cost of those errors is measurable only if there is a way to account for the time needed to correct the errors, or if there is a measurement of the efficiency lost through the employee's errors. In many cases, neither measurement capability exists.

It's really only in large companies that training costs are easily measured. These organizations have formal training programs wherein costs are budgeted, carefully watched and controlled. These organizations find that their training costs are high. The costs include the cost of maintaining instructors, the cost of keeping real estate dedicated to training facilities and the cost of maintaining in-

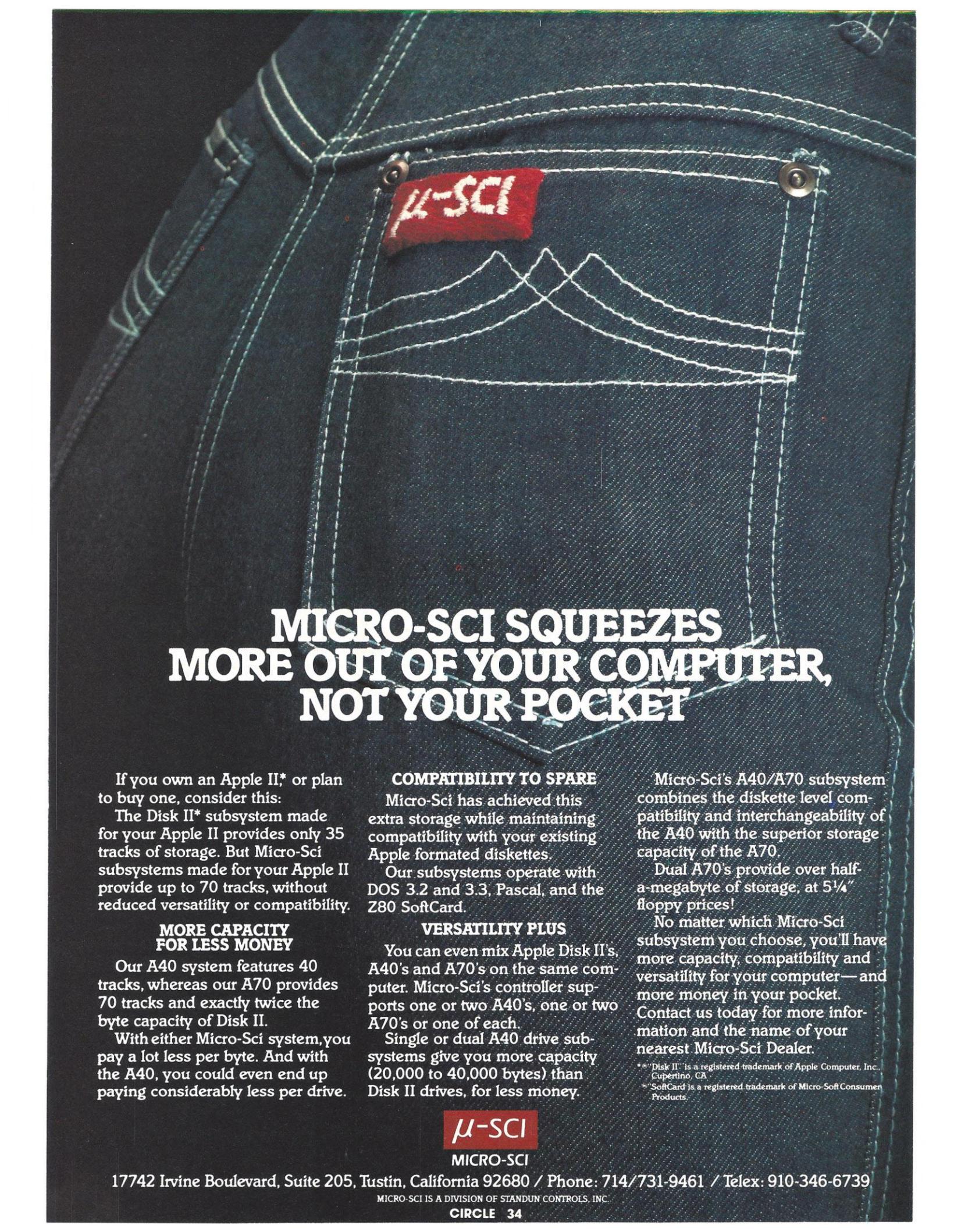
structional aids such as audio-visual equipment.

Is it any wonder, then, that large organizations are turning to non-traditional means to try to increase the efficiency of, and reduce the cost of, the training process? One of those means is the personal computer.

"Even someone who has no prior experience with computers can sit down with the system and be creating instructional materials in a matter of about 10 minutes."

Salute and compute

The U.S. Army provides a case in point. This organization is constantly training to accomplish its mission—winning a war. And this training goes on at enormous cost, for in this organization, there are costs associated with training other than those encountered in civilian firms. Tank-gunnery training, for example, in-



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cludes the cost of fuel to get the tanks moving, to say nothing of the cost of the ammunition that is destroyed in the training process.

So the Army is investigating the use of modified video-arcade games to accomplish some gunnery training. The costs mentioned could clearly be eliminated in any training in which such games were used.

The business world

There are at least two systems in the commercial world that can aid in training employees in corporations. One of them is a multimedia system from Bell and Howell Audio-Visual Products Division in Chicago. The other is a software system from Micro-Lab in Highland Park, Ill.

The former is presently being used in large corporations like General Motors and Standard Oil of California. (More about those companies' successes in future issues of *Personal Computing*.) The latter is a relatively new system, and thus far its use has been confined to traditional educational institutions. But its generality means it could be applied to other learning situations, like employee training.

Bell and Howell's PASS (Professional Authoring Software System) is designed to incorporate specific subject content and to integrate video tapes or other audio-visuals as appropriate. The system runs on Apple computers. After an instructor has completed the particular program of instruction, copies of the disk on which the program is recorded are made and distributed to the instructor and to the students. The student can then proceed at his own pace, and the system will branch into review or more advanced work—depending on the students' success with current study assignments.

Since the trainee is able to move at his own pace, "The net effect is akin to the viewer's being able to fully control the content, speed and presen-

tation of a television detective show according to how he responds to the clues that are presented in that show," says Bruce Frisch, vice-president of marketing for the Bell and Howell Division. That's because, Frisch notes, the system allows companies that use it to incorporate video situations that correspond to actual corporate situations, whether the tapes are previously available in the company or they are made up specifically for the PASS system. In either case, "The sole determinant of how the program proceeds is the learner's ability and comprehension," says Frisch.

He claims that the system is much lower in cost than those computer-assisted training systems that have been used in the past. Many of these systems are prepackaged systems that feature training modules in certain fixed activities like record-keeping, the operation of generic plant designs, running of resource-

training session for the day is complete, the personal computer at the heart of the training system can be used for other functions, at no additional cost.

Meanwhile...

Almost as versatile, although somewhat more limited, is the Learning System from Micro Lab, a small company in Highland Park, Ill. Deborah Mihm, a company spokeswoman, says the learning system has gained quite a following in the educational community, although not as yet in the training community.

The Learning System has a structure similar to that of PASS. The instructor can write his teaching program himself, using materials that are completely of his design. Students can then use the program in one of two modes—instructional or test.

In the instructional mode, the student is led through the lesson, which consists of questions preceded by

"Large organizations are turning to non-traditional means to try to increase the efficiency of, and reduce the cost of, the training process. One of those means is the personal computer."

allocation models and the like. How well such existing systems lend themselves to individualized-program development varies.

And besides that problem (in the industrial world anyway) most of the systems run on large mainframe computers, and are accessed through time-sharing terminals. Frisch estimates that this can cost over \$100,000 just for the specialized programming and equipment needed for the training implementation.

In contrast, PASS leases for \$5000 per year. The hardware needed to run PASS costs about \$4000. After the

compositions that contain the main teaching points to be covered in the lesson. Students read the compositions, and then answer the questions pertaining to them. The system prompts and helps the students during the course of the lesson. When the student feels he is ready to be tested on the material, he can take a test, written by the instructor and tailored to the needs of the trainee.

Tests are of three possible types—multiple choice, fill-in-the blanks or column-matching. The tests are written on the system master disk, along with the answers. Then the test,

minus the answers, is recorded on a test disk. When students are ready to take a test, the testing action is initiated for the student through the use of a player disk. This disk loads the test to be taken into memory, along with sufficient programs to load and

result in a more creative training program.

Both PASS and the Learning System allow this benefit. In fact, Mihm claims that the Learning System is so simple to use that students can even take the system home with them and

that he was doing extremely well, and wondered if the student had his book open. This caused some consternation, since that was what was happening—the student was cheating in a learning exercise. Presumably, that student now has much more respect for a personal computer.)

The Learning System requires an Apple II Plus with 48k of RAM, a monitor and at least one disk drive, although Mihm says that two drives make the system easier to use. If the training group is large, a printer is helpful, she says.

Using a printer, the instructor can print out and copy learning exercises for students' use if the number of students exceeds the number of computers available in the organization. ■

run the test.

The system will record students' scores, but only on the tests. The questions the student answers in the instructional mode are a "free ride." But the recorded answers from the tests allow the instructor to score the tests and to do a certain amount of analysis on the test results as well. Mihm says this capability allows instructors to catch students who have clear remedial problems that must be handled. In addition, the analysis allows instructors to check the characteristics of their tests to see which questions meet good test criteria and which may be suspect. In this way, instructors can refine the tests to get consistently good results.

The system, says Mihm, is completely menu-driven and user-friendly. "Even someone who has no prior experience with computers," she says, "can sit down with the system and be creating instructional materials in a matter of about 10 minutes."

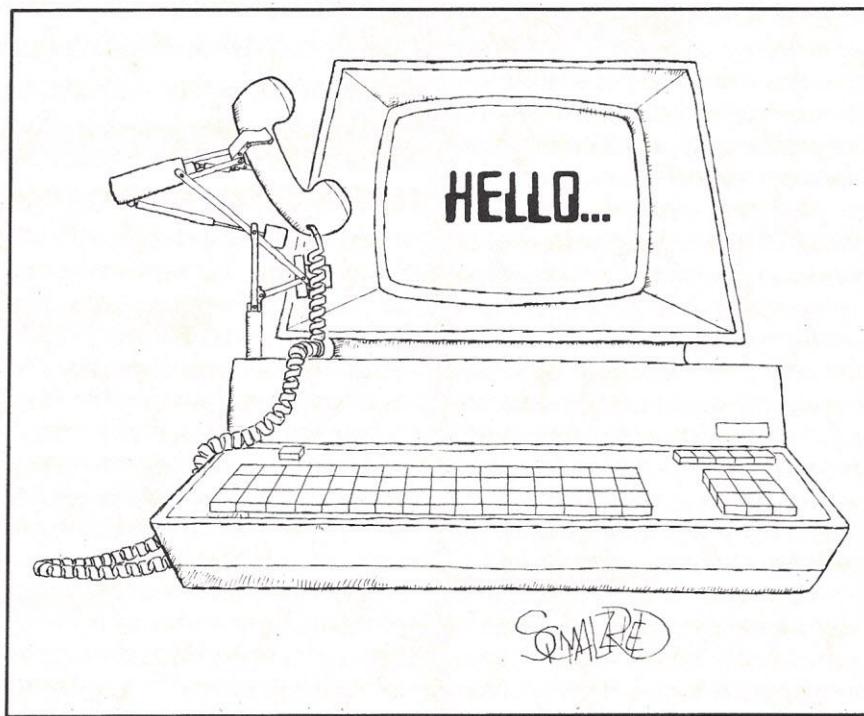
Some free time

One of the benefits of using personal computers for training is the machines' ability to free the instructor from repetitive tasks. This allows him to move on to tasks that demand an instructor's expertise. This should

use it for home-study assignments if those seem appropriate.

While the student is going through the learning exercise, the system can substitute for the teacher in another way—by rewarding the student with praise for correct answers, and gently encouraging him when he makes an error. Mihm says that the Learning System has messages that provide this service as a matter of course. (In one case the system told a student

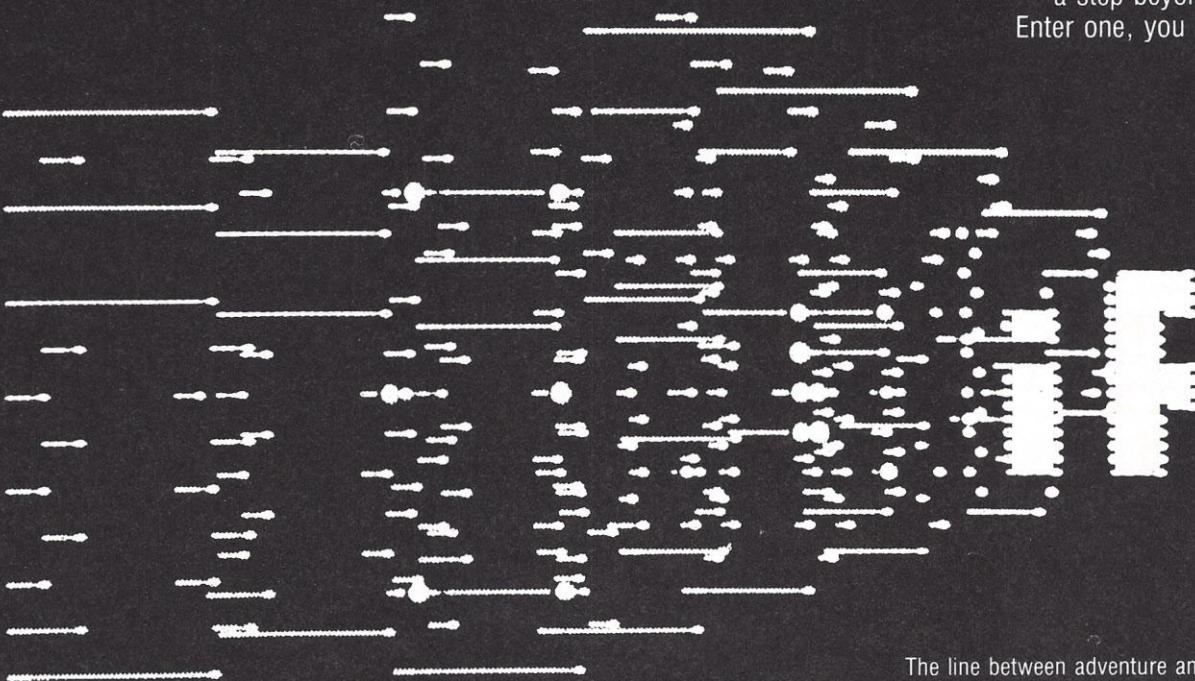
More information about the learning systems can be obtained from Bell & Howell, Audio-Visual Products Division, 7100 McCormick, Chicago, IL 60645; (312) 262-1600 and Micro Lab, 2310 Skokie Valley Rd., Highland Park, IL 60035; (312) 433-7550.



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CIRCLE 17

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CIRCLE 18

ADVANCED COMPUTING

High-level languages—
which is for you?

Many factors must be considered before you decide on a high-level language. The decision can be made easier by knowing exactly what those factors are

Choosing from among the many high-level programming languages for a personal computer can get to be a bit like a trip through Wonderland with Alice. But knowing the different languages and their applications can eliminate the feeling that you're a stranger in a strange computer world. There is no mystery or magic involved. Familiarity is the key.

Even if you've decided that a language like BASIC is your choice, there's still a selection to be made as to which one. The maker of your per-

sonal computer may not be of much help with this decision. Each manufacturer seems to have extended the language in its own special way—compatibility between different versions of the same high-level language may not exist.

Although this lack of compatibility may make a choice of language difficult, there is a rational way to approach the wide selection. First, you'll have to make some hard decisions that will affect your final choice. Be prepared to go back to square one as you work your way through selecting a high-level language.

Clearing the fog

While it may sound a bit simplistic, the first step in choosing a language is to decide what type of programs you need and who will write them. If your involvement in the software will be minimal, your major choice will be whether or not to use canned or custom programs. If you choose this route, Darshan Singh

Khalsa's guide "Custom vs. canned software: what do you need?" on page 124 of *Personal Computing*, (Octo-



ber 1981) will help you along the way. The high-level language used will be dictated by the canned software or the programmer you select.

Once you've decided what types of programs you need, be they scientific, business or games, then the hardware must be factored into your decision. If you haven't yet purchased a personal computer, then you'll have a large selection of high-level languages from which to choose. If you already have a system, the range of high-level languages available will have some limits.

Non-languages

For some applications, the use of a non-language should be considered. These non-languages are special-purpose commands used in canned

Other non-languages are the electronic spreadsheets available for personal computers. These programs allow the entry and manipulation of data in a tabular format. They are especially useful for finding the answers to numerical questions inherent in sales forecasting.

Commands specific to the package let a user run "what if" tests and manipulations on the data. If the spreadsheet contains sales data, a user can find out how an increase in overhead, like a 10 percent increase in rent, would affect the profit on a month-by-month basis for a whole year.

Program generators are also non-languages. These are generally menu driven. A user answers a set of questions like how big the address field for a customer order file will be, or how

Even if the programmer doesn't meet all of your special needs, it helps block out programs. Many users have found that what they thought was an "absolute necessity" when planning a set of computer programs, proved to be of little or no use six months and many dollars later.

You should thus consider alternatives like a DBMS or an electronic spreadsheet before deciding to go the custom route for programming. You may find that a high-level language isn't really what you need. After all, the bottom line for any personal computer system is finding a solution to a problem, and not how the solution is accomplished.

The Tower of Babel

The number of high-level programming languages is overwhelming. There is COBOL, PL/I, BASIC, Dyna, Lisp, Neliac, Snobol, LOGO, Forth, Small Talk, Jovial, Flap and others. These represent usable languages for different kinds of computers, but the range of usable languages for personal computers is limited.

BASIC (Beginner's All Purpose Symbolic Instruction Code), is widespread on personal computers and it comes in many forms. The most common form is BASIC in ROM written by Microsoft. It's available on several personal computer, including the Apple, TRS-80, Commodore Pet/CBM and Ohio Scientific computers. Disk-based versions of BASIC also abound.

FORTRAN (FORmula TRANslation) is not as common on personal computers. This language is designed for scientific and engineering calculations (number crunching).

COBOL (COmmon Business Oriented Language) is another available language, but it's not often used on personal computers. It's the most commonly used high-level language for large computers for business-applications programs.

"Once you've decided what types of programs you need, be they scientific, business or games, the hardware must be factored into your decision. If you haven't yet purchased a personal computer, you'll have a large selection of high-level languages from which to choose."

packages like a DBMS (Data-Base Management System). Rather than write a program in a high-level language like COBOL, the user writes a series of commands, or answers a series of questions. This list then drives the canned program in a series of pre-programmed operations.

As an example, a DBMS is really a program that allows the user to store and retrieve data from a series of files. One can set up a DBMS to handle a mailing list. When starting the program, the user defines the size and types of files needed for the names and addresses. These data, after entry into the data base, can then be sorted, changed and printed.

the file data need to be sorted. The program generator then puts together a series of canned routines, such as a sort routine and a formatted printer driver, into a complete custom program.

Personal computer program-generator packages are relatively new. Some require that the user do some cleanup of the generated code, but for a fast-and-easy method of writing custom applications programs, these could be very useful. You should consider one of these packages if you have a working knowledge of programming and don't have the time or the desire to write a special-use program.

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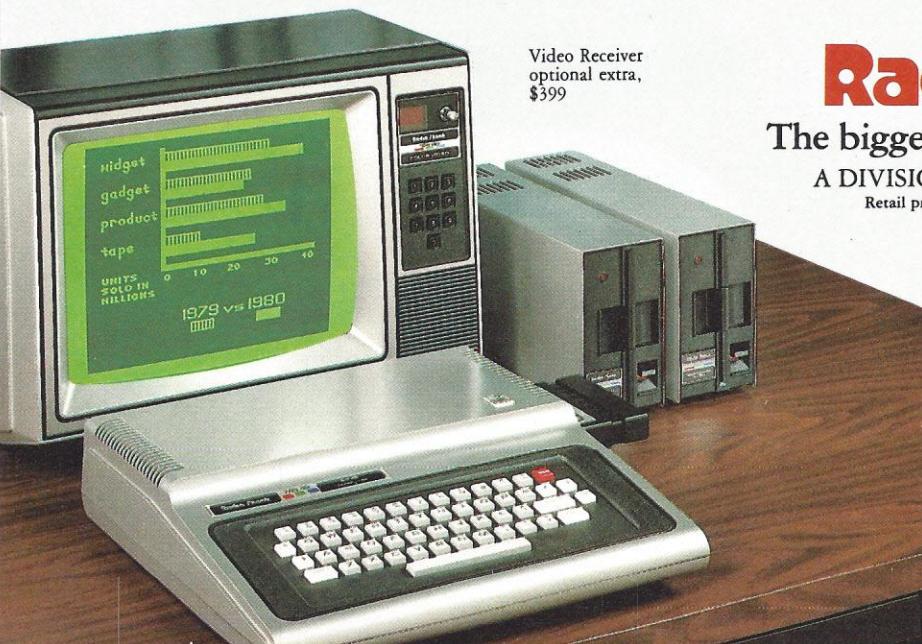


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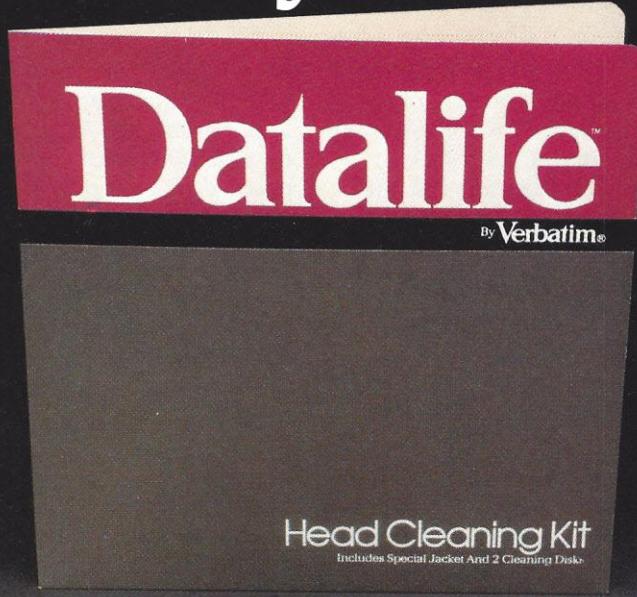
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Pascal (named after Blaise Pascal, the 17th-century mathematician), is a relatively new high-level programming language used most often in the academic community. Although it is called a high-level language, Pascal is really a programming environment. The package contains both a high-level language and an operating system.

Forth (originally Fourth, for fourth-generation, but the early IBM computer on which it was first programmed only allowed a five-letter file name), is another example of a programming environment. Forth is unique in that it can be extended by the user.

As an example, a tiny Pascal interpreter has been programmed in Forth. The language was originally developed for real-time control applications, but has found a secure niche in the engineering community.

Ada (named after The Countess of Lovelace, the first programmer), is the latest high-level language to be boosted by the Department of Defense. It's intended as a common language for all DOD applications, including business-type programming and automatic-test equipment programming.

Functionally, the language is a superset of Pascal. At present, the language is starting to emerge in operational form. Only subsets are available for personal computer use. If future use of Ada is being considered, Pascal is the obvious choice as a starting point.

The high-level "C" programming language retains much of the flavor of assembly language. Within the personal-computer field it's not widely used, but this is changing. C is the primary language for the Unix operating system. As Unix appears on personal computers, the C language will gain much wider use.

Although these high-level languages are probably the most widely used on personal computers, there are

quite a few others. For example, Lisp has been implemented for personal computer use, but languages like Lisp are generally for special use. Unless your applications is out of the ordinary, BASIC, COBOL, FORTRAN, Pascal, Forth and C are the primary palette of the high-level languages from which to choose.

Language implementation

There are several ways that high-level languages are implemented.

"Although a lack of compatibility between different versions of a high-level language may make the choice difficult, there is a rational way to approach the wide selection of languages."

The types of implementation in general use are interpreter, compiler and p-code.

An interpreter implementation of a high-level language scans (parses) each line of the program (source) code and then changes (interprets) it into machine code each time it's used. This can be quite slow, particularly with complex program statements.

In general, references of a line of the program by another program line or lines creates another slow down. If the 100th line of the program must branch to the 500th line, the interpreter starts at the beginning and sequentially looks through the entire program until the referenced line is found. This is slow but effective.

An interpreted high-level language must have all of the package available in memory. For a large program this isn't a disadvantage, but if the program is a simple one, like a dedicated control application, then the cost of the memory-space taken up by the unused part of the interpreter can be costly. An interpreter for a high-level language like BASIC generally

uses from 8 to 12 kbytes of memory.

Compiler implementation

Another type of implementation involves compilers. When a high-level language is built around a compiler, the source code is interpreted only once. The compiler then changes the language into machine code and saves it. The compiling process does the parsing and interpretation of the source code "off line." The compiled program then runs as if it were origi-

nally written in assembly language.

One disadvantage of a compiler system is that each time there is an addition or modification to the program, it must be re-compiled before it runs on the computer. This can be a slow process on a large program, as the compile time can take several minutes.

Another disadvantage is that compilers are generally disk based. If your storage needs are small, in many cases you'll have to add disk drives to the system.

The size of the compiler's run-time package is also a consideration. Many compiler-implemented languages have a standard run-time package of subroutines. These packages generally take up at least 4 kbytes of memory, with many running to 12 kbytes. Only a few compilers add run-time modules as they are used by the program. An example are those modules needed for double-precision arithmetic.

A false code

The third type of implementation

involves p-codes. P-code (pseudo code) was developed to allow portability of programs from one type of computer to another. In the p-code system, typified by UCSD Pascal, the high-level source code is compiled into a pseudo machine code (p-code). This p-code is then interpreted by a module written in assembly language for each type of processor used.

The advantage of the p-code system is that a program written on a 6800-based personal computer can be run on a Z80 machine without change—only the p-code interpreter is processor dependent.

The disadvantage of the p-code system as compared to compiled code is that it has two time delays. It is delayed when it is compiled and then when each program line, now converted to p-code, must be interpreted each time it's run.

Considering these delays, there is a tradeoff involved. The more compact

"For some applications, the use of a non-language should be considered. These non-languages are special-purpose commands used in canned packages like a DBMS."

compiled p-code uses less memory than most straight interpreters. The interpret time for the simplified p-codes is much less than that required to parse and interpret high-level languages implemented as an interpreter.

Although these three types of implementation are the most common, there is another type. Some high-level languages are implemented as a combination of interpreter and compiled p-code. In this approach, the program is written and debugged with the interpreter. When this is completed, the same software package converts the source code to a p-code and saves it on disk. The same

software is used for the interpreter, p-code conversion and the run-time package.

At least one personal computer, Western Digital's Pascal Micro-engine, uses p-code as its native language. The p-code interpreter is part of the microprocessor's chip set. National Semiconductor has a microprocessor that includes a BASIC interpreter within the chip. Several other companies are rumored to be at work on microprocessor chips that use Forth as the native language.

The BASIC language

The most common implementation of BASIC uses an interpreter system. If you are developing programs, the instant load-and-go of an interpreter system is a big plus. You can write or modify a line of code and test it immediately. The tradeoff is the slower speed of an interpreter as compared to a compiled program.

BASIC in ROM is that if there is any bug in the code, it can only be corrected by changing the ROM. This can get expensive, as many versions of BASIC in ROM require up to four ROM chips.

Another disadvantage of ROM-based BASIC, or any other high-level language, is that in most cases a user must call the desired applications programs from disk using the disk operating system (DOS). With a disk-based BASIC, most DOSs let the DOS, BASIC and the applications program load at the same time—the user has only to boot up the system.

Which BASIC?

There are several BASIC packages on the market. The two primary packages are MBASIC (both ROM and disk-based), from Microsoft, and CBASIC from Digital Research. Both are for 8080/Z80 personal computers, and both operate under Digital Research's CP/M operating system.

For the 6502, 6800 and 6809 microprocessors, there are both compiled and interpreter packages for BASIC. BASIC packages for these processors include those from Technical System Consultants (TSC) with packages for the 6800 and 6809, and Microware's 6809 compiler package. Hayden has a compiler for the Apple II that converts Applesoft source code into 6502 machine code. The same selection criteria that apply to MBASIC and CBASIC also apply to high-level languages for these processors.

The ideal BASIC is one that allows program development in the interpreter mode and then compiles the BASIC program into machine code. This combination gives the user a fast method of debugging a program—long waits for a new compile after a minor change aren't needed—and gives a fast-running program for actual applications use.

You'll find interpreter BASIC in ROM in many personal computers, including the Commodore PET/CBM, Atari and Apple. Other personal computers used for business applications, like NEC's PC-8000, come with interpreter BASIC in ROM. Some, like the Smoke Signal Broadcasting units, do not. These units use a disk-based BASIC that's loaded into RAM.

The advantage of interpreter BASIC in ROM is that it's up and running when the power is turned on. You don't have to wait for the disk to load. ROM is also considerably less expensive per byte than RAM.

The disadvantage of interpreter

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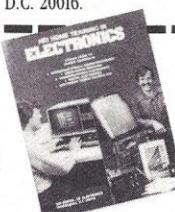
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If you already have a personal computer system, and BASIC is selected as your high-level language, then the selection is probably limited. If the computer has Microsoft's BASIC in ROM, the choice of compiler is limited to one that's compatible with that particular BASIC in ROM. For example, Radio Shack's compiler works with its ROM-based BASIC for the TRS-80.

When selecting a BASIC, consider the possible future use of the applications programs. If it's possible that

of the system. A low-cost Pascal package, such as Radio Shack's Tiny Pascal, may be acceptable for the novice programmer. But unless features such as disk-file handling and I/O control are in the package, you'll be very restricted as to the kinds of applications programs you can write.

Another factor to consider with Pascal is the large amount of memory it requires. While some full-featured Pascal packages are quite compact, most require 64 kbytes of RAM—the limit for most low-cost personal

"Commands specific to the electronic spreadsheet package let a user run 'what if' tests and manipulations on the data."

you'll wish to run them on a wide variety of computers, then factor this into the decision-making process.

If you decide on Digital Research's CBASIC, you'll have compatibility with most Z80-based personal computers. If you choose MBASIC, then your programs, within the limits of special disk and video commands, should run on the PET/CBM, Apple, TRS-80 and the Atari. Microsoft's BASIC is also used on some of the Japanese computers that are becoming available on the U.S. market.

A replacement language

In addition to BASIC, another common high-level language is Pascal. Pascal is often touted as the language that will replace BASIC. Pascal's major advantage is that its modular structure forces a programmer to be organized. Also, if you are looking to the future and feel that Ada may be the focus of your programming, Pascal is the obvious place to start.

One problem with Pascal is its cost. As an example, the Apple Pascal package adds about \$500 to the cost

computers.

Check to see how much memory is needed by the run-time p-code interpreter. If it's large, and most run at least 24 kbytes or more in size, add the cost of adding more RAM to the system when making the choice.

When considering Pascal as a programming language, note that there are two ways that it has been implemented for personal computers—p-code and native code. Because of the speed limits of the p-code approach, many makers of large computers, like Digital Equipment, implemented Pascal so that the compiler outputs native code (machine code) for a specific microprocessor. The speed and memory requirements must then be considered when choosing which Pascal is right for your computer.

Using FORTRAN

If Pascal is not the right choice for your machine, you might want to consider FORTRAN. This language was developed as an engineering tool for solving complex equations. It is usually in compiler form. Until re-

cently, FORTRAN was generally available only on minicomputers and mainframes, but some FORTRAN packages are now available for personal computers.

One advantage of using FORTRAN is that there are a large number of available stock (library) routines for the language. A user adds these library routines to a program at compile time. In some cases it's only necessary to design the flow of a program and to write a core module that calls the individual library routines.

Also, if you need scientific and engineering calculations, the vast amount of programs available in FORTRAN are a decided asset. This can well offset the \$750 or more that a FORTRAN package with extensive library modules can cost.

One disadvantage of FORTRAN is that it is not interactive—the complete program must be compiled every time a change is made. The passing of variables from one FORTRAN module to another is also quite cumbersome.

If you wish to try FORTRAN, packages for personal computers like the TRS-80 are available for under \$200.

Need a Forth?

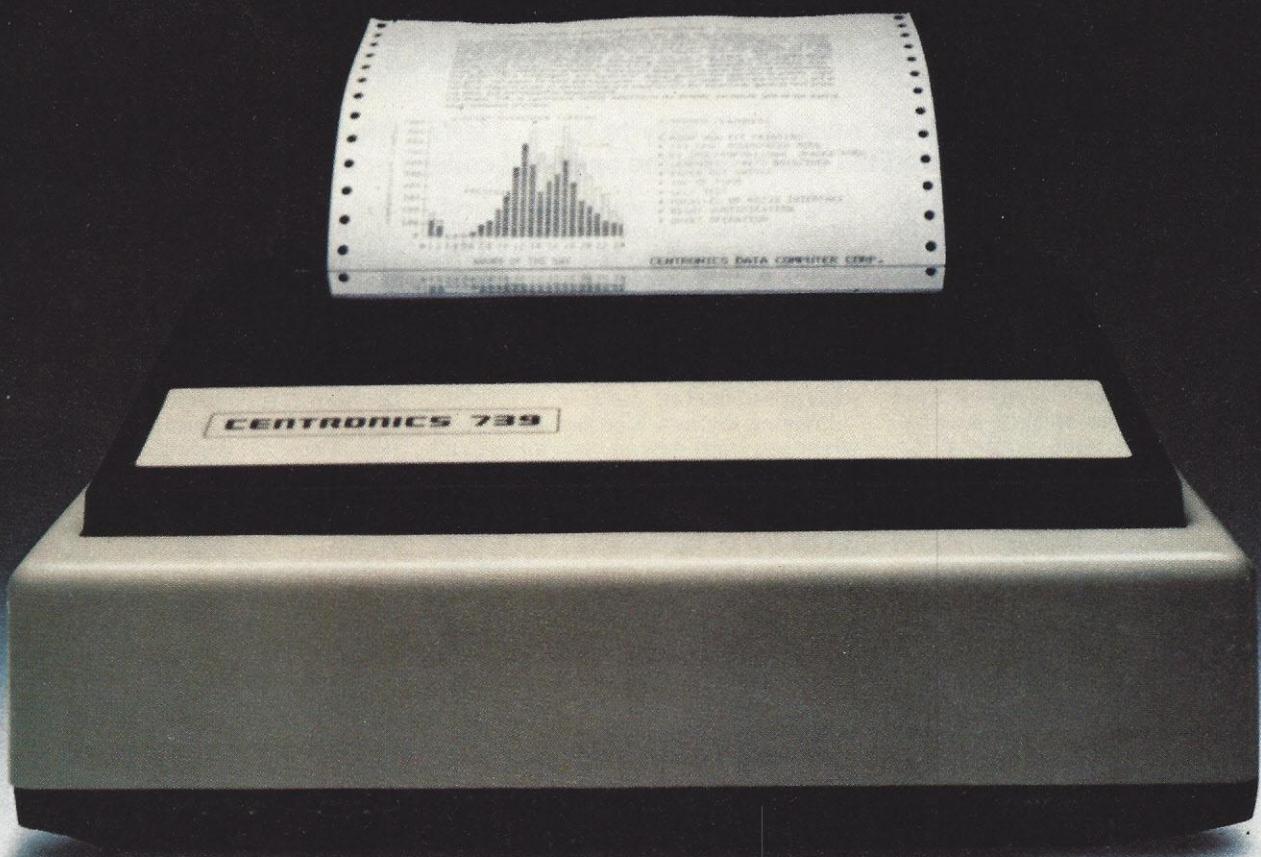
Before deciding upon FORTRAN for your applications programs, care must be taken to review other options. One such option is Forth.

Forth is a rather unique language that has gained much favor with engineers. It's the only commonly available personal computer language that can be extended by the user. This makes it an ideal language for process control and custom applications such as graphics.

The Forth language is implemented as an interpreter, but as each line of code is entered, it's compiled. This interactive line at-a-time compiling makes it possible to

continued on page 101

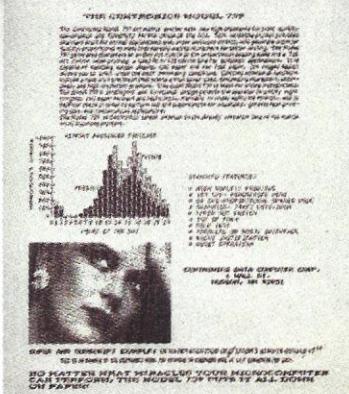
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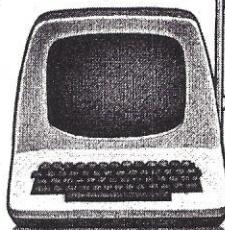
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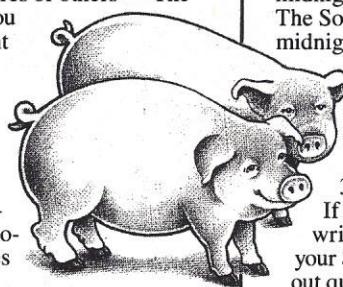
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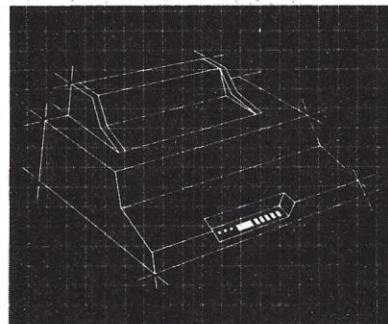
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*Data Source: Epson MX-800 Operation Manual

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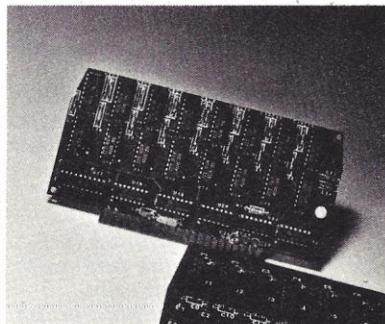
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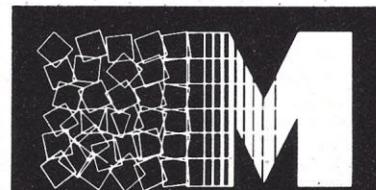
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HOME COMPUTING

Energy analysis for effective consumption

Solar architects are turning to personal computers to formulate critical answers to pressing problems

During the past decade, solar energy has wavered between being the darling and the black sheep of the energy world. And although once seen as the savior that would end the United States' appetite for imported oil, its stock foundered a

few years ago—a victim of government budget crunching, energy-industry apathy and infighting over what a solar home should look like.

Active units, passive units, pumped collectors—just the whisper of these terms in a room full of architects five years ago in Colorado or California set off a rash of scurrying to briefcases for each to produce their unquestionable personal design of the ultimate in solar architecture.

Simple is beautiful

Much of that is over. With the end of large-scale government funding, solar supporters—forced to go it alone now—have taken a more sober

look at the home designs available to collect their favorite energy source.



They've concluded that simpler is far more beautiful.

Ironically, while the personal computer as an invention is arguably one of the most complex that humans have devised, solar architects appear to be on the threshold of adopting it to enhance some of their most uncomplicated designs and to improve their ability to create these designs. These architects feel that the personal computer is easing solar energy's transformation from an exotic form

of heating to a credible energy source.

In solar architecture the movement from active to passive systems has been a conscious effort to avoid the mechanical failures that could turn an economical home into a money eater.

Active units were rushed on the scene in the early 1970s during the first sharp blows of the oil crisis. Simply, as the name "active" implies, they are a labyrinth of moving

parts—pumps, valves and switches—connected to the solar rooftop heat collectors. All this boiler-like machinery is intended to drive the heat through the house.

But too often the solar mechanisms clunked and ground to a halt just when the wind and cold began to swirl outside. Moreover, while possibly lowering the consumption of oil by a few gallons, massive amounts of electricity were being used to power the sun's free heat through the

TABLE 1
SUNDAY VERSION 4.1
BUILDING LOAD SIMULATION PROGRAM

STATION: YAKIMA
 LATITUDE: 46.50
 RUN DESCRIPTION: DIRECT GAIN OPTIMALLY INSULATED BUILDING
 TOTAL HEAT LOSS RATE: 230.00 BTU/HR*F
 LOW SET POINT TEMPERATURE: 68.0 F
 HIGH SET POINT TEMPERATURE: 76.0 F
 NIGHT SET BACK TEMPERATURE: 60.0 F
 NIGHT SET BACK HOURS: 8
 HOURLY APPLIANCE HEAT GAIN: 2000.0 BTU/HR
 APPLIANCE BALANCE POINT TEMPERATURE: 56.6 F
 NON-REFLECTED PERCENTAGE OF TRANSMITTED/ABSORBED RADIATION: 95%
 TOTAL WINDOW AREA: 150.0 SQFT
 NUMBER OF GLAZINGS: TRIPLE GLAZED
 WINDOW ORIENTATION: S - 100.0, E - 20.0, N - 30.0
 BEGINNING OF SEASONAL SHADING: MAY
 ENDING OF SEASONAL SHADING: SEPT
 SOLAR HEAT GAIN FACTOR (SHADING): 0.40
 HEAT STORAGE: 13000.0 BTU/F

MONTH	SET-POINT HEATING LOAD	APPLIANCE BAL-POINT LOAD	ACTUAL HEATING LOAD	COOLING LOAD	USEFUL SOLAR GAIN	USEFUL APPL GAIN	FRACT USEFUL SOLAR	FRACT USEFUL APPL
1000's BTU								
JAN	6785.	5297.	4204.	0.	1093.	1488.	0.95	1.00
FEB	4770.	3426.	1598.	0.	1828.	1344.	0.92	1.00
MAR	4692.	3204.	794.	30.	2410.	1488.	0.86	1.00
APR	3206.	1834.	151.	286.	1682.	1372.	0.63	0.95
MAY	1637.	622.	34.	218.	588.	1015.	0.57	0.68
JUNE	771.	180.	0.	654.	180.	591.	0.18	0.41
JULY	463.	89.	0.	1513.	89.	373.	0.08	0.25
AUG	580.	110.	0.	1450.	110.	470.	0.09	0.32
SEPT	1424.	527.	0.	425.	527.	897.	0.41	0.62
OCT	3015.	1625.	121.	621.	1505.	1389.	0.55	0.93
NOV	4576.	3140.	1617.	0.	1523.	1436.	0.92	1.00
DEC	6330.	4842.	3702.	0.	1140.	1488.	1.01	1.00
TOTAL	38250.	24898.	12221.	5196.	12677.	13352.	0.64	0.76

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home so that the cost savings became negligible.

Raising questions

From the failures of active systems, passive units emerged. Passive solar homes are built to merely welcome the sun's energy, trap it in a thermal mass such as masonry in the floors and walls, and reradiate it as heat through louvered vents or with low-energy fans.

For an architect, designing a passive unit means facing a spate of questions and balancing as many tradeoffs. For instance, how much insulation is necessary to cover the home's requirements? Is more glass needed on the south side? Is it better to build a well-insulated building with small windows, or to have large windows and greater heat-storage inside?

Exploring possibilities

"For the first time we have a tool that lets the architect do this kind of exploration," says David Straub, a former researcher for the U.S. Department of Agriculture, "and at zero cost if they already have a personal computer."

The tool is called SUNDAY, a program that simulates the heating requirements of a building, based on such factors as compass orientation, window glass area and thermostat settings. Straub and an associate, Larry Palmeter, a former director of passive solar research at the National Center for Appropriate Technology in Montana, developed SUNDAY at the Ecotope Group in Seattle, a consulting firm for architects and construction engineers.

"The basic idea behind simulating heating requirements is not new," Straub adds. "There have been models for active solar systems in Europe since the 1970s. What is new about SUNDAY is that it is the first simulation for passive solar systems—for the building as a whole. SUNDAY is a tool that will run fast,

for very little cost, and still give reasonably accurate results."

SUNDAY is unique in both its passive solar orientation and the fact that it's a personal computer-based program. In many ways it comes out of work already done by one of its creators.

Sophisticated programs

Palmeter, who was the contractor on the first 10 passive solar houses built in New Mexico, has specialized in detailed thermal modeling of buildings. He is the author of a very sophisticated computer program called SUNCAT, which uses hourly weather data and up to 100 inputs from walls or floors, sampling them as often as 10 times every hour.

Calculating the solar heat when model building requires that SUNCAT make and store millions of computations. Since joining Ecotope last year, Palmeter has written a proprietary version of SUNCAT, called SUNCODE, and both of these require a minicomputer to run.

"People don't realize how slow a personal computer is compared to a mini," says Palmeter. "To do all the calculations for a full annual run on SUNCODE—with floating-point arithmetic—takes six minutes on a DEC PDP-10 minicomputer; about 10 hours on a 16-bit, single-board personal computer; and over 30 hours on an 8-bit Z80 running at 4 MHz." To laymen, this means that minicomputers can juggle larger numbers, and more of them, faster than smaller computers can.

Fast and easy

SUNDAY is a lot simpler than SUNCODE, using only daily weather measurements and much fewer sample points on the building. "Compared to SUNCODE," says Straub, "SUNDAY is grossly simplified, but it's fast and easy to use so that you can explore many possibilities. The SUNDAY figures are

within one or two percent of the daily SUNCODE analysis, where heat is the significant factor."

According to Straub and Palmeter, SUNDAY is useful for simulating the heating and cooling requirements of residential and light commercial buildings. "Larger buildings generate a lot more heat," says Palmeter, and are therefore less sensitive to the impact of solar energy on their outside walls.

SUNDAY is a typical personal-computer program in that it prompts the user to enter relevant data, one item at a time. The user types in the orientation of the building, the glass area, the temperatures at which a thermostat will switch the heat on and off (set points), the expected contribution of appliances—and people—to the internal heat and the months when trees or awnings will shade the windows. That takes a few minutes. The calculations themselves take only about ten seconds, during which time SUNDAY reads weather data previously stored in the computer's memory. The results appear in table 1.

Increasing complexity

"When we wanted to design a simulation package for personal computers, we couldn't just cut back SUNCODE," Straub says. "We had to start by asking 'What is the least amount of information I need to accurately predict a building's heating load?' We increased the complexity of the SUNDAY simulation until we came close to the results that SUNCODE produces."

Straub says that they settled on five main energy use factors and identified their sources. The heat-loss rate and the heat-storage capacity are calculations made by the architect or builder, based on construction materials and window glazing. Similarly, the architect determines the building's orientation and the square

continued on page 93

KNOWLEDGE IS POWER

True when Sir Francis Bacon said it in 1597 at the dawn of the scientific age. And true a thousand times over in 1946, when the brilliant mathematician John Von Neumann supplied the key idea—the stored program—that made possible the modern computer.

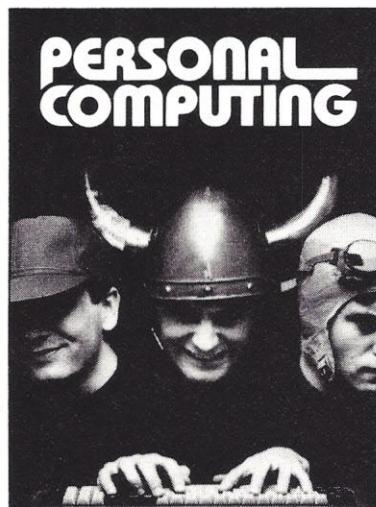
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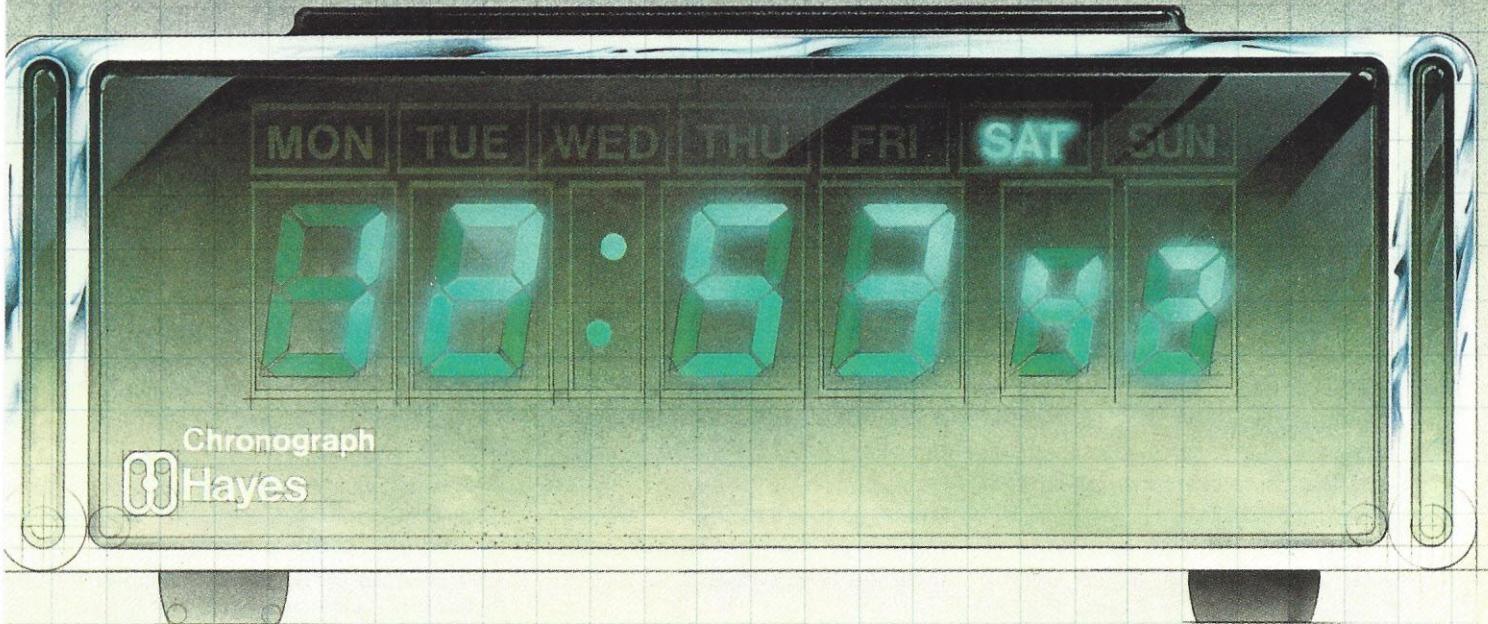
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BUSINESS COMPUTING

Mailing-list packages—a mainstay for business

Here are 18 mailing-list packages that can help you keep abreast of your sales, clients and target markets



Mailing-list packages don't have to be expensive to perform the needed functions. They don't have to be hard to use. They don't even have to be difficult to find. There are many flexible, versatile and powerful mailing-list packages available that you can learn to use in hours, if not minutes, and these can cost as little as \$50.

During the early years of the personal-computer revolution, mailing-list applications were touted as one of the main ways consumers could use computers.

While consumers failed to respond to the mailing-list software, small- and medium-sized businesses caught on fast, especially those that depended heavily on office workers and promotional sales. Businesses that had never before been able to afford mailing lists found that they could now make large sales, stay in touch with clients or customers and target their markets.

One man who took advantage of mailing-list programs is Oliver Emmert, president of Alpha, Etc., of Shelby, N.C. This fabric distributor has tripled the size of his mailing list with Galactic's Mass/Mail Subscription System (on the 64k TRS-80 Model II with a DataSouth 180 cps line printer) from 3000 to 9000 names. His staff sends out 500 to 600

sales brochures each day with no problems at all.

Most important to Emmert is the package's coding system. Using six select codes, each customer is coded by geographic region and by account type such as yarn, hobby goods and needlecraft goods. The system allows Alpha to very closely target each type of customer with the right type of sales brochure.

"I have seen a marked improvement in the results from our mailings. We can send out more brochures more frequently and stay on top of the account maintenance much better. We can even include a coded history for new and prospective customers when we establish their record in the system," says Emmert.

Emmert has experienced no serious problems with software bugs, and he says that he and his staff had no problems learning the system. It has worked so well that he is outgrowing the software's 10,500-record capacity, so he'll have to buy another system or go to a hard disk on which he can set up multiple files of several thousand names each.

Features to consider

What makes mailing-list software good? How can you tell a package that fits your requirements from one that does not? The first feature to consider is capacity. Many packages, like the Radio Shack Mailing List II,

have a small total-system capacity. Radio Shack's limits are 3000 names using smaller-than-normal fields in each record.

This type of package is system-bound; no matter what you do, the software cannot handle more than its stated capacity. Even Stonehenge Computer's 30,000-record system using the Corvus hard disk is system-bound.

Other packages are simply disk-bound. These can handle an unlimited number of records, limited only by the number they can hold on each disk. Each must also allow transfer of file names and records among disks.

The second feature to consider is the format and the number of lines allowed in each program. There are two basic format types: fixed- and free-form. Fixed means that the fields (or lines) are already defined in the package and cannot be changed without significant modifications. Free-form means that the user defines the format for each list. Both the Prodigy Mailing List and Easy Mailer have a free-form format. Prodigy has a large array with more than 100 user-definable categories and Easy Mailer has a small form letter/mailing system.

In addition to these two basic formats there are combinations and variations. The Synergistic Software package gives you a choice of three

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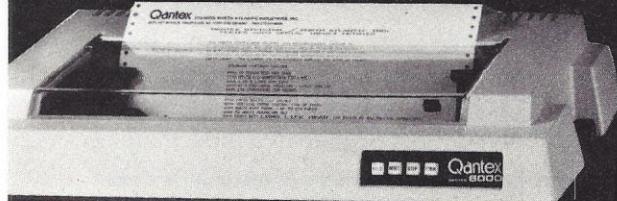
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T.M.S. System i/S	(45) 02-840784
ENGLAND	
Northamber Limited	(44) 372-67646
FRANCE	
Gepsi	(33) 1-554-9742
GERMANY	
Technitron	49 (89) 692-4141
HONG KONG	
Hong Kong Equipment	3-444216-8
Computerworld Ltd.	5-440033
ITALY	
Eltron	39 (30) 55026
NETHERLANDS	
Computadata Benelux B.V.	31-73-422045
PORTUGAL	
Decada Equipamentos de Electronica Lda	351-19-558609
REPUBLIC OF CHINA	
Microcontrol Corp.	(02) 703-1842
SINGAPORE	
General Engineers Assoc.	
Pte. Ltd.	2729412
SPAIN	
2i Ingeniera Informatica	204-2099
VENEZUELA	
Sysgen Data	02-719455

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fixed-forms. Others such as Dr. Daley's package include default formats, but allow users to redefine the layout if they choose. A few programs also include several comment or code lines into which various types of information can be placed. This information can include telephone numbers, sales figures or personal information.

When deciding which program best fits your needs, it is also important to study their sort and search functions. Combined with the format layout, these determine how flexible and versatile the system can be.

You may be both pleased and dismayed by the variety of sort and search functions inventive programmers have included in mailing-list packages. The two simplest types are zip code and alphabetical searches. More advanced programs such as Micro Business Systems Mail List include up to 100 user-defined categories and up to 10 user-defined types of sort headings. With the same package, you can sort by any of the five standard fields including business name, street number, street name, city, state and zip code.

A number of other packages sort by number or alphanumeric codes as well as (or instead of) either name or zip code sorts and searches. At least two of these are flexible. Software Sorcery has a function that prints all of the records that match any of the characters in a six-character code. If you tell the program to print all entries with A***BC, it will print any record with A in the first position, B in the fifth position and C in the sixth position (A111BC, ADEFBC, A999BC, etc.) Dr. Daley's package has the same function with more searching capability and calls it Group Search.

A few packages will sort and/or search by more than one field at a time. Micro Computer Industries' Create-A-Base uses a simple six-step process to sort by two fields at the

same time. The same package allows sorting by any of 10 fields. Several other packages allow you to sort/search or print by various codes or groups of codes.

For example, DYNACOMP uses a code line of up to 21 keywords made of three characters each. You can input a code of AAA to mean that the company in the record is a preferred customer, a code of BBB to indicate a credit limit of \$10,000 or a code of CCC to show that the customer is a garment manufacturer. It's up to you to design your own codes and keep them straight.

More than just mailing

These types of coding and the inclusion of comment lines, telephone numbers and other information not directly related to a mailing address make these packages potentially powerful data-base management tools. Prodigy's mailing package is basically a powerful information-management system with a different name.

Non-address information lines in these packages store useful information. When you can also sort, search and print with them, they allow you to precisely select target audiences for anything you wish to mail. Peachtree, for example, has external and select codes. The former is used for ID, social security, telephone, account or employee numbers. The latter can be divided into as many as 12 yes/no categories of 12 interest areas which you define.

The first character could define sex; the second, age by category (21-29 might be the letter A); the third, income (the number 1 could stand for an income between \$5000 and \$10,000); the fourth, (the letter B for a product interest such as baby clothes); and so on. A select code of FA1B would then indicate that this person is a female between the age of 21 and 29 with an income of between \$5000 and \$10,000, who is interested

in buying baby clothes. You could easily determine that you might not sell \$100 satin baby sheets to this person, but you might sell \$5 booties.

This application can also be used by businessmen who wish to target those customers who are most likely to buy certain products and not others. They can save money by printing fewer, shorter and more specialized solicitations, and by sending fewer letters to "non-customers."

This allows a user to do the highly sophisticated direct-mail solicitations that only large organizations could afford in the past. Arming small-businesses with sophisticated marketing techniques is another of the dozens of ways that personal computers battle the industrial giants which have more money and marketing muscle.

Increased capability

Another option available to mailing-list users is a package that merges mailing addresses with form letters. If your business frequently corresponds with individuals on the mail list, or if you want your clients or customers to get "originals" of form letters, solicitations, collection or subscription renewals or inquiries, you may need this capability.

As James Hunt, an industrial distributor notes, not every industry or business needs form letters to get its point across. The Missionary Baptist Seminary in Little Rock, Ark., uses the Corvus hard disk-based Stonehenge Computer package for its follow-up to requests for literature, sales leads, new product information and monthly specials. The seminary then sends these requests to religious bookstores and individuals, according to Jerry Baldwin, an Apple dealer who installed the seminary's system.

"The seminary mails newsletter subscriptions twice a month. It has about 6000 names on its current list. It keeps track of all subscriptions and renewals and prepares these mailing

Ten reasons why your floppy disk should be a BASF FlexyDisk.



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CIRCLE 26

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CalcStar software eliminates the need to use ledger paper ever again. It turns your video screen into a "window" on a giant electronic ledger sheet, with up to 600 entries arranged the way you want. Then, by inserting formulas into CalcStar, you create financial models that simulate the future numerically. And predict the outcomes of your business decisions.

When you notice what CalcStar can do for your business, you'll wonder how you ever got along without it. (If you're now a WordStar user, you probably already know the feeling.)

The MicroPro bonus. Like WordStar, CalcStar is packed with innovative features that make it versatile and easy to use. Features like Automatic Forms Mode, which lets an inexperienced user enter data into a spread sheet quickly and with less chance of error.

CalcStar's greatest innovation is its ability to join with WordStar. Which means, for example, you can use WordStar's printing options, like boldface and underlining, to dress up financial documents. And you can insert sections of CalcStar's spread sheets into your WordStar documents.

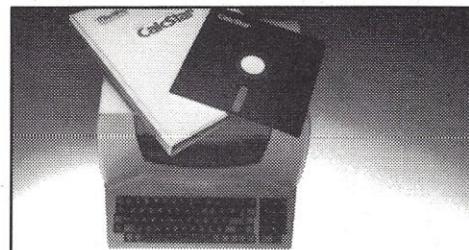
This kind of flexibility should come as no surprise if you're already familiar with the MicroPro software family—a line of programs designed to work together to multiply your problem-solving power. Visit your MicroPro dealer to find out just how big a difference *all* our products can make in your business. We predict you'll discover it's not just CalcStar or WordStar that's indispensable. It's MicroPro.

Presenting CalcStar—another standard-setting software product in the WordStar tradition.

CalcStar is MicroPro's new electronic spread sheet and financial modeling program—a sophisticated, yet easy to use, calculating and planning tool for CP/M®-based computers.

The ultimate electronic spread sheet.

CalcStar calculates solutions to complex numerical problems in business and finance. Helps you make budget plans and sales forecasts with greater speed and accuracy. And projects figures into the future to answer the "what if" questions you face in business. And CalcStar also has a unique MicroPro advantage: It joins with WordStar to combine spread-sheet and word-processing capabilities in several powerful ways.



A glance at CalcStar features

Runs on CP/M version 2.0 or above, with 80-column screen, addressable cursor, and at least 48K memory. 56K or more is recommended for fullest utilization.

Highly user friendly: Call up full screen of help or use help menu. WordStar-like cursor commands. User's guide shows you the basics. Install from menu OR a WordStar file.

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BUSINESS COMPUTING

MAILING LIST BUYERS' GUIDE

COMPANY	NAME/COST	CONFIGURATION/CAPACITY
Apple Computer 10260 Bandley Dr. Cupertino, CA 95014 (408) 996-1010	APPLEPOST \$49.95	Apple II 48k, two drives; Qume or Centronics printer; Max. capacity: 30,000 on six drives, 6000 on two; DOS 3.2.1.
Charles Mann & Assoc. Micro Software Division 55722 Santa Fe Trail Yucca Valley, CA 92284	Apple III Mail List Manager Price not announced.	128k Apple III, one extra drive; Qume Sprint 5 or Silentype III printers; Max. cap. 960 records per diskette, unlimited diskettes, but two extra drives required.
Computer House Division F.L.C., Inc. 1407 Clinton Road Jackson, MI 49202 (517) 782-2132	Mailing List \$80	Part of both Master Text Processor and Docuwriter Text Processor packages; Apple II Plus, 48k; AppleSoft in ROM; Capacity: 300 records per file, unlimited files.
D.B. Software 11840 NE Brazee Portland, OR 97220 (503) 255-7735	Mailing Lister \$59.95	32k Commodore 2001, 4032 or 8032 computer; CBM Dual Disk Drive 2040, 4040 or 8050; Tractor-Feed Parallel Printer. Capacity: 500 names per disk.
Dr. Daley's Software Water St. Darby, MT 59829 (406) 821-3924	The Mail List V4.8 \$179.95 V4.4 \$159.95	TRS-80 Model I and II 32k, one disk drive, any OS with RS Microsoft BASIC Level II; Small capacity.
DYNACOMP 1427 Monroe Ave. Rochester, NY 14618 (716) 442-8960	Mail List Release 2.2 \$34.95	Version 4.8 runs on CBM 8032 computer with 8050 disk; Version 4.4 on CBM 4032 or 8032 computer with 4040 disk. Capacity: V4.8 = 4,164 records per disk; V4.4 = 1,345 records per disk. 80 disks per file and unlimited files.
Galactic Software 11520 N. Port Washington Rd. Mequon, WI 53902	Mass/Mail Subscription System \$299.95	48k Apple II, 48k Atari 800, 56k North Star Horizon and CP/M systems; one or two disk drives; printer. Min. capacity: 1100 records per single density diskette.
Information Unlimited Software 281 Arlington Ave. Berkeley, CA 94707 (415) 525-9452	EasyMailer \$69.95	TRS-80 Model II, 64k; one or more drives; TRSDOS 2.0 or later version; 80- or 132-column line printer. Max. capacity: 10,500 records on 3 drives.
Micro Business Systems 7725 Broadway Suite B Merrillville, IN 46410 (219) 769-3445	Mail List \$150	32k TRS-80 Model I, or 64k Model II, with one or more disk drives, line printer. Capacities: Model I up to 600 records per diskette; Model II up to 2500 records per disk.
Micro Computer Industries 1520 East Mulberry Fort Collins, CO 80524 (303) 221-1955	Create-A-Base \$100	48k Apple II, II Plus, or Pascal System; At least one disk drive; 13- or 16-sector; DOS 3.3; printer with interface card. Capacity: related to size of fields and records compared to disk capacity in bytes.
North Star Computer 14440 Catalina St. San Leandro, CA 94577 (415) 357-8500	Mail Manager	64k TRS-80 Model II; CP/M OS; 132-column printer; at least one 8-in. drive. Max. capacity: 14,500 with four drives, or 2500 with one drive.
Peachtree Software Retail Sciences Three Corporate Square Suite 700 Atlanta, GA 30329 (404) 325-8533	Mailing List/ Mailing Address \$295	CBM 8032/8096 32k; 4040 or 8050 dual disk drives; CBM 2022 or 2023, NEC Spinwriter 5530, Mannesmann Tally 8024 printers. Capacity: 999 records per diskette
Prodigy Systems 497 Lincoln Highway Iselin, NJ 08830 (201) 283-2000	Mailing List System (part of system price)	56k North Star Horizon; at least two double density or quad density disk drives; printer. Capacity: From 376 records to 3010, depending on number and type of drives.
Radio Shack Computer Merchandising P.O. Box 2910 Fort Worth, TX 76102	Mailing List II \$299	Apple II 48k, or any 48k CP/M 8080, 8085 or Z80-based systems; 80- to 132-column printer; two disk drives; Microsoft BASIC. Capacity: 1200-1500 records per disk.
Software Sorcery 7927 Jones Branch Dr. Suite 400 McLean, VA 22102 (703) 385-2944	Mailing List \$49.95	Prodigy System, 64k Z80 based, IBM standard 8-in. floppies; PROTEGE OS. Capacity limited only by disk capacity, unlimited files.
Stonehenge Computer 89 Summit Ave. Summit, NJ 07901 (201) 277-1020	Commercial Mailer \$250	TRS-80 Model II, 64k, 1-4 disk drives, 132-column printer, TRSDOS 2.0a OS. Capacity: 3000 maximum.
Synergistic Software 5221 120th Ave. S.E. Bellevue, WA 98006 (201) 226-3216	Mailing List Database \$50	Apple II with AppleSoft ROM or Language Card, or II Plus, Apple II disk subsystem with at least one drive, and a compatible printer. Capacity: 500 records per diskette.

lists," Baldwin says. All of this information doesn't require much "personalized" attention, so a system without form-letter capability, but with a large capacity, was best for the seminary.

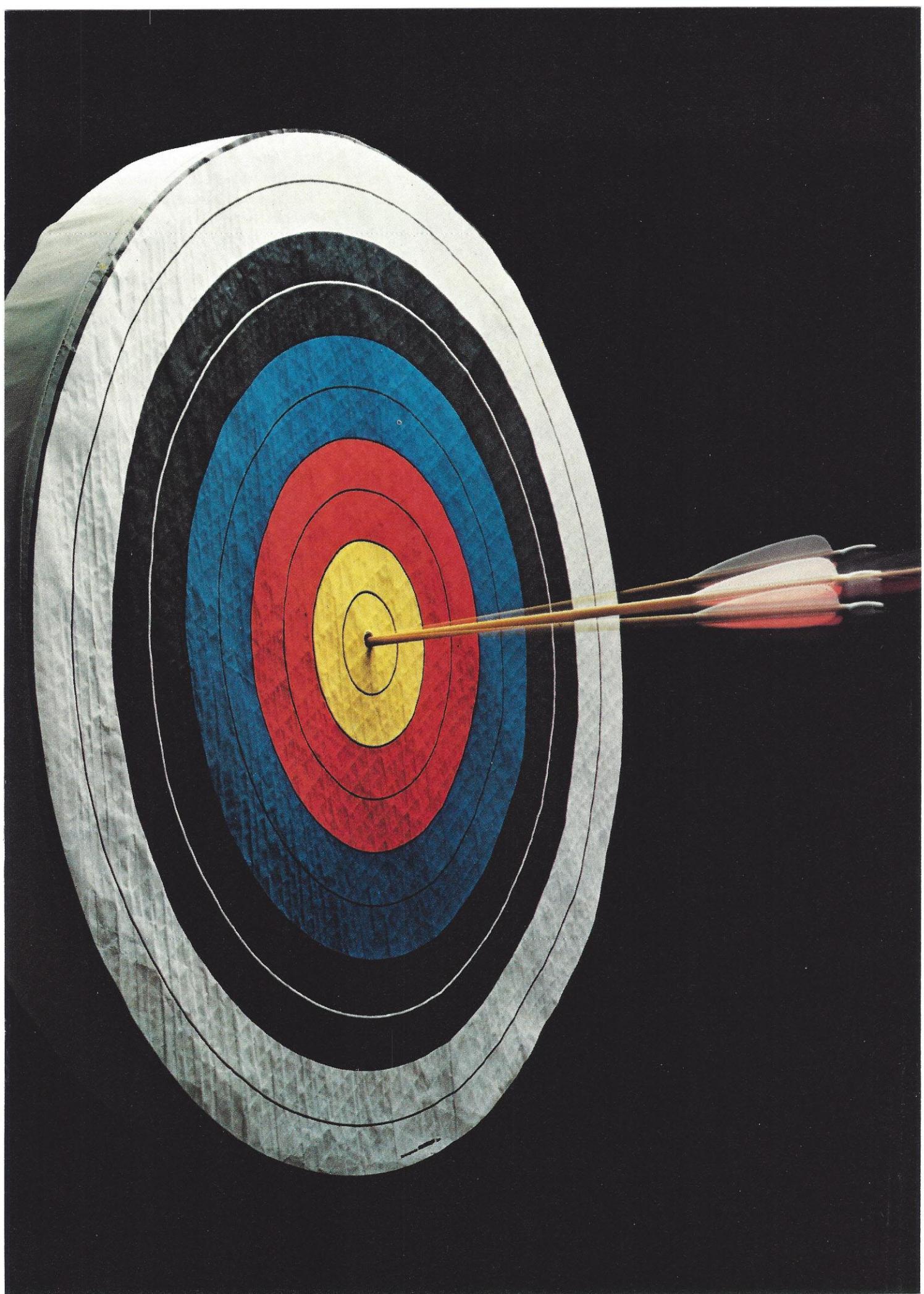
A number of good packages that work with word-processing software are also available. These include EasyMailer with EasyWriter, Charles Mann's Master Mail with two of its text editors, Radio Shack's Mailing List II with Scripsit, D.B. Software's Mailing Lister with a form letter you add to the list, Create-A-Base with WordPro and others.

In addition to form-letter and word-processing capability, printing functions should also be considered when purchasing mailing-list software. That is where sorting and special coding functions will be the most useful. Generally, special coding or sorting procedures will only print labels that match their selected criteria. Synergistic, for example, will do a three-field search and produce a printed report limited to sort by state, last name and first name.

Print functions can also have their own characteristics. Most packages let you choose a range of labels to be printed by zip code, code numbers or by last or full names. All of the packages will print every label, but some print in zip code order only, some in code-number order only, some in name order and some in the order the records were entered (sequentially).

Choosing the right mailing-list package for your business requires a careful balancing of your requirements with the features available in each package. These features include package capacity, available lines or fields, formats and flexibility, variety of search and sort functions, form-letter merging, type and variety of printing functions and special miscellaneous functions unique to each package.

continued on page 84



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continued from page 81

Among the mailing-list packages available you should be able to find the best one for your business. Discussed below are 18 mailing-list packages. They include some of the most and least expensive, and some with complete or limited features. The packages cover a spectrum of

prices and features to give you a good idea of where to begin searching for the package that best fits your needs.

18 packages

Apple Computer's **APPLEPOST** was one of the first mailing-list packages. The main problem with this program is that it is difficult to exe-

cute a function without cycling through unnecessary graphics.

APPLESOFT does have one unique feature no other package has—a "soundex" search or find. If you don't know the correct spelling of a last name such as Johnston, you can enter Johnson or Jenson and the program will call up all of the records

NAME AND ADDRESS RECORD CONFIGURATIONS

This table describes the maximum number of characters allowed in each field or line of each in each mailing list package.

Records/Company	Apple Computer Applepost	Charles Mann and Associates	Computer House Division	Dr. Daley's Software	D.B. Software	Dynacomp	Information Unlimited Software	Micro Business Systems	Micro Computer Systems	North Star Computer	Peachtree Software	Prodigy Systems	Radio Shack	Stonehenge Sorcery	Synergistic Software		
Name	25	30*	33	40	30	12#	40&	27	15%	15**	30	25	##	16	40	32	24
Surname						12			20	15	25			18	40	32	24
Company Name		30	33	40	30	15	40	27	25	20	20	30		20	40	32	
Street Number										8							
Address Line	25	30	33	20	30	20	40	27	20	12	25	30	25	20	40	32	24
Address Line					20					20	20	30	25		40	32	
City		30		20		18		15	15					20		32	13
State		30		2		2		3	2					2			2
City/State	20		33		30		40			25	25	25	25		40	32	
Zip Code	9	9	33	9	10	5	9	11	5	9	9	6	5	9	10		9
Telephone	12	12		10		12		14	12		12	25					12
Telephone Ext.								4									
Comment Line	10		33	40		13			8	2	30	25		20		30	10
Code Line			33	40			15	6		6	30	25					3
Keyword Sort	10					8											
Label Code		30															
Header Line					X												
File Name						8											
Control No.								5									
External Code												12					
Select Code												12					

*—Apple III Mailing List Manager standard format.

#—Dr. Daley's default values. Allows up to 15 fields and 117 characters.

&—Dynacomp has five lines all user-definable and up to 80 characters per line with CP/M systems; 40 with Apple.

%—EasyMailer is completely user definable for up to 36 fields per record and these are just sample numbers.

**—Create-A-Base is completely user defined with horizontal and vertical layouts. Example shown above. Stores up to 10 user formats.

Maximum 24 fields and 220 characters.

##—Prodigy System has 1,024 user-defined categories and 144 lines per record.

EDITOR'S NOTE: These names and numbers correspond to the numbers at the heading of the configuration and features sidebars.

JINSAM

Data Manager selected by NASA, Kennedy Space Center

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JINSAM is an integrated system. It makes it easy to use your information to its fullest. No more will hundreds of valuable hours be spent searching or analyzing needed information nor re-entering information for various reports.

JINSAM transforms your desk-top computer into the "state of the art" data processing machine with features and accessories found nowhere, even at 10 times the price. NASA, Kennedy Space Center selected JINSAM 8.0 and saved approximately \$95,000 over other software/hardware costs. Riley County, Kansas also selected JINSAM 8.0 and saved approximately \$90,000 over other software/hardware costs.

JINSAM is designed for you. It is forgiving. It has help commands for every option, available at the touch of a button. The amount of information you store, its structure and/or your hardware can change but your data won't have to be re-entered. Recovery utilities are included even for catastrophes, security passwords are built in for privacy, simple editing and entry includes auto recall, and deleting records is easy and the space is reclaimed. JINSAM includes TWO FREE accessories for reports and labels. You have unlimited report formats with summing and lined up decimals and the label printer prints up to 5 across - any size and even allows single envelopes or index cards.

JINSAM 1.0 allows fast and easy file handling, manipulation and report generation for any CBM computer with CBM 2040 disk drive. It features a menu for ease, has encrypted passwords, 3 deep sorts, .5 to 3 second recall.

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JINSAM 8.0 for CBM 8000 series has all 4.0 features plus unlimited sort, horizontal format, and search by key or record number.

JINSAM 8.2, NEW FOR '82 expands 8.0 capabilities by adding information search by word, key or record number and machine language print, format and manipulation routines.

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- ★ CUSTOM REPORTS/LABELS
- ★ KEYED RANDOM ACCESS
- ★ FAST/EASY/MENU DRIVEN
- ★ MULTIPLE SEARCH KEYS
- ★ PRIVACY ACCESS CODES
- ★ WILD CARD SEARCH

JINSAM EXECUTIVE version (soon to be released) is our most powerful professional system for the CBM 8000 and 9000 series. Executive will have 8.2 extended features plus allow multiple users with in-use lockout protection, executive command files, automatic math relations, join, merge or link files, greatly increased record capacity and machine information search by word, as well as by key or record number and many, many more features.

There are currently 7 more interfacing modules - and more under development, including independent interfaces between JINSAM and business packages for your G/L, A/R, A/P needs. We announce the availability of modules and enhancements in JINSAM's quarterly newsletter.

WORDPROPAC - Intelligent interface for WordPro 3, 3+, 4, 4+, creates lists of information from JINSAM files. It allows up to 10 conditions based on each item of information. Produce individualized letters, report cards, special reports, checks, invoices, etc.

MULTI-LABEL - Prints multiple labels per record with up to 2 lines for messages and consecutive numbering. Produce inventory, caution labels, bulk mail labels, etc.

MATHPACK - global calculator/editor +, -, *, /, by another field or constant; null (remove contents) of a field or replace contents of a field with any word, number or phrase. Sum multiple fields in each record or running sum of single field in all records. Extract information or effect permanent change. Replace in the same field or place in a waiting field.

DESCRIPTIVE STATPACK - Determine MEAN, MEDIAN, MODE, STANDARD DEVIATION, VARIANCE, RANGE. Generate HISTOGRAMS from 1 to 25 steps, and produce Z-SCORE reports.

ADVANCED STATPACK - (You must also acquire DESCRIPTIVE STATPACK) Generate one, two or three way CROSSTABS (number of occurrence) CHI SQUARE, LINEAR REGRESSION, with graphic representation and prediction, LINEAR CORRELATION and SIMPLE ANALYSIS OF VARIANCE.

CALCPACK - 2 way interface to VisiCalc or any user program. It lets you use VisiCalc for complex manipulation, editing, placing results in JINSAM for sorting, storing or moving data to WordPro as well as giving the ability for exchange with your own applications.

INTERAC - Interface which can read VisiCalc files, WordPro files and almost any sequential files

to build JINSAM databases automatically. For example: You could "download" information on hollerith cards to sequential files and INTERAC would place them into JINSAM files.

All accessories are accessed thru the JINSAM menu and require security password to gain entrance.

JINSAM gives you FREEDOM OF CHOICE. Start with JINSAM 1.0 and upgrade hardware and data at any time. Choose from accessories at any time. The JINSAM Newsletter brings the latest updates, user input and uses and keeps an eye on the future.

JINSAM stands alone by placing "a lot of potential computing power in one integrated program package" (Fred Klein, Ferson div. of Bausch & Lomb). "The JINSAM package is justification for buying a system no matter what the hardware, be it Vector or Commodore or whatever the system" (Larry Colvin, Micro Computer Systems). It is a "grandfather" in this young field since the first JINI MICRO database system has been marketed since 1979. JINSAM EXECUTIVE will be the third generation in development. All JINSAM systems are sophisticated and flexible yet easy to use. JINSAM is saving its users valuable time and money in government, educational and research institutions, business and industry worldwide.

JINSAM is a Commodore approved product. See your local dealer for a demonstration.

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JINSAM Data Manager

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Name _____

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Company _____

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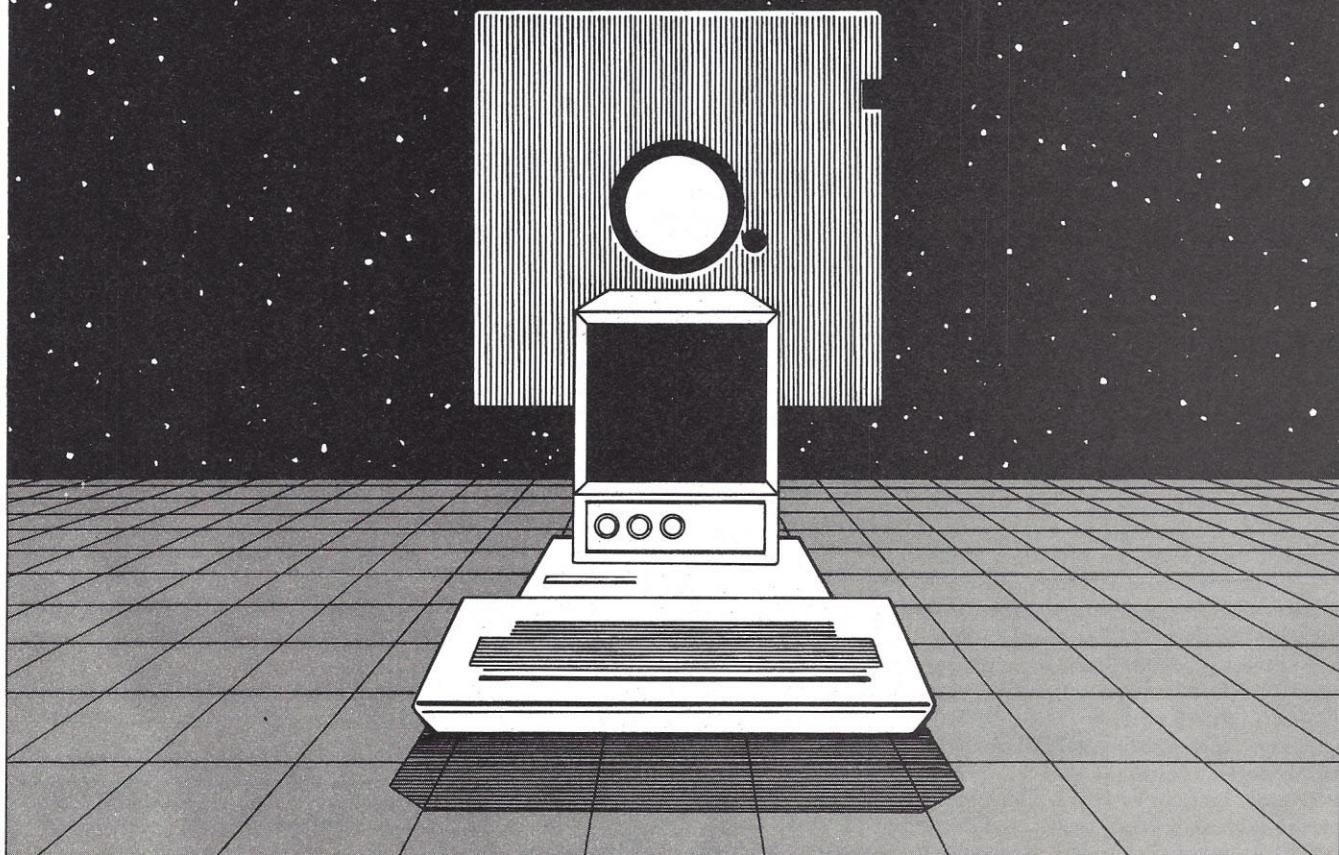
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THE APPLE SPELLER fills the void that has consistently kept the large variety of excellent word processing packages for the Apple II Computer from approaching the power of a dedicated word processor. Finally, the first professional quality spelling verification program is available for the Apple II. The Apple Speller will certainly be the standard against which all other similar programs are compared.

The Apple Speller interfaces to the most popular Apple word processors including Applewriter, Apple Pie, Superscribe II, and Magic Window just to name a few. In fact, the Apple Speller can analyze the output of any editor that writes a standard Apple binary or text file to a diskette. In addition to this flexibility, the performance of the Apple Speller will astound the microcomputer world.

The Apple Speller is supplied with a 30,000+ word dictionary on a single 5 1/4" diskette with additional space to easily add another 8,000

words to suit your individual needs. The Apple Speller has built-in utilities to maintain the dictionary diskette. You can readily add words, delete words, and create an unlimited number of modified and/or new dictionaries for specific applications.

The Apple Speller is unbelievably fast. The first pass reads your document and collects all the words it contains at a rate of 5,000 words per minute. Next, the words are compared to the dictionary for spelling errors at the incredible speed of 50,000 words per minute. Finally, all misspelled words are marked as such in your document with a rate of 1,000 words per minute. This translates to proofreading a 10 page document in 1 minute if there are no spelling mistakes and 2 minutes, 15 seconds for an unlimited number of spelling errors.

Numerous options are provided throughout the program to enable you to completely control all activities of the Apple Speller. These include the ability to ignore both

control codes and formatting commands, an alphabetical listing of either misspelled words or all the words in your document along with usage frequencies, multiple options for the action taken with each misspelled word, and much, much more! A verification mode is provided to allow you to examine and dispense with misspelled words while viewing them in the actual context in which they appeared in your file.

The Apple Speller requires an Apple II/Apple II+ equipped with 48K, Dos 3.3, and two disk drives.

The Apple Speller is being introduced at the incredible price of **\$75.00!**



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CIRCLE 113

with last names that sound like Johnson or Jenson.

Also in the program's favor are its manual and "floating select" codes. The manual is well written and easy to use. The floating select codes allow you to pick records based on two character choices. You can choose letters A and B as the codes in any column such as A in column 2 and B in column 5. (It would choose records such as ZAXXB or DACDB.) The program will also print out a separate list of telephone numbers for sales calls.

Another package from Apple Computer is its **APPLE III Mailing List Manager**. This package retains APPLEPOST's good features, including soundex. It provides a standard-default format, but also allows you to easily define your own format. It includes four types of searches, and allows you to step through the program with single keystrokes—first, next, last and previous. It will also sort, merge and print "subsets" or sections of a list based on what is listed on the label and comment lines.

Charles Mann & Associates includes its **Master Mailing List** program in its two text-editor and processing packages. The mailing-list package is also combined with its medical-office package. Although the program has many desirable features, they are hard to find because the manual is not tutorial.

The package does contain standard features that add to the company's text-editing or medical-office packages. It has an eight-field fixed format with two comment/code fields, and five methods each to search and sort. These methods are by first and last name, city, zip code, code field and comment or optional field. When printing, the package uses standard labels and can print from one to three across at a time.

Computer House Division has a simple mailing-list program with a fixed 10-line format for some Commodore computers. It includes two

comment lines with up to 80 characters of any kind of information. It also has a good error trap in its two-character state field; it will only accept a correct abbreviation for each of the 50 states and D.C.

The program only prints out by zip-code range, with two labels across and four lines down. It has no search or sort procedures, just a sequential review by company name. You can edit each entry after it is displayed and reviewed.

D.B. Software's **Mailing Lister** features speed and merging capability. It merges with form letters you store with the mailing labels themselves. It uses last names and zip codes (with a delimiter asterisk and a three-character code attached) as the first two lines for sorting and searching.

Two useful printing functions include printing either labels or envelopes with a one keystroke command, and printing by selecting

mailing-list codes and beginning and ending zip codes.

Powerful package

Dr. Daley's Software **The Mail List** is a powerful mailing-list software package for the Commodore computers. It is written with a combination of BASIC and machine language which makes it fast. It also has a well-written, clear and concise manual. Its advanced version 4.8 can hold a large 4164 records per disk, and can handle up to 80 disks with one file name, a feature rarely found in other programs.

The package includes two function keys, one that retrieves a constant field for each record, and one that calls up a particular field from the previous record. You can set up the print routine according to four parameters you choose, and you can print out any four of a total of 15 fields.

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has large fields—an entire line on the Apple II—and comes with prefix and suffix codes that make sorting and printing very flexible. It can store up to 1200 records on one disk. Its manual is short and to the point.

Its six-line, free format is based on a code line. This code line is determined by groups of three letters. You can enter any information on this line, but the total must be a multiple of three. You must also identify and

remember the meaning of your code lines.

Handling mail codes

Galactic Software's **MASS/MAIL SUBSCRIPTION SYSTEM** handles both foreign and U.S. mail codes. Its

MAIL LIST CHART OF FEATURES

Feature/Company

	APPLE COMPUTER	CHARLES MANN	COMPUTER HOUSE	DR. DALEY'S	D.B. SOFTWARE	DYNACOMP	INFORMATION	MICRO COMPUTER	NORTH STAR	PEACHTREE	PRODIGY	STONEHENGE	SYNERTIC
Feature/Company	APPLE III MAILING SYSTEM	APPLE II MAILING SYSTEM	COMPUTER HOUSE DIVISION	DR. DALEY'S SOFTWARE	D.B. SOFTWARE	DYNACOMP	INFORMATION UNLIMITED	MICRO BUSINESS	INDUSTRIES	COMPUTER	SOFTWARE	SORCERY	SOFTWARE
Formats:													
—Fixed	●	●	●	●			●	●		●	●	●	●
—Free-form		●			●	●	●		●	●	●		●
—Combined		●									●		●
—Default	●	●		●		●			●	●	●	●	●
Sorting:													
—Alphabetical	●	●		●			●	●	●	●	●	●	●
—Zip Code	●	●	●		●		●	●	●	●	●	●	●
—Surname		●	●						●		●	●	
—First Name													
—Keyword/number		●	●		●	●		●	●	●			
—Range of names	●	●											
—State				●									
—Secondary field			●			●			●	●	●		
—Multiple fields													●
Searching:													
—Keyword	●		●				●	●	●	●	●		
—Name		●	●		●		●	●	●	●	●	●	●
—Zip Code	●	●	●				●	●	●	●	●		
—Browse	●								●				
—Code name/number	●		●			●		●	●	●			
—Phonetic		●											
—First Name			●									●	
—City			●									●	
—Suffix/Prefix					●	●						●	
—Multiple fields													●
Search Functions:													
—First record	●							●			●		
—Last record	●							●			●		
—Advance one	●							●			●	●	
—Reverse one	●							●			●	●	
Default entries	●										●		●
Duplicate delete						●	●					●	
Merge mail lists						●	●	●	●	●	●	●	●

records are based on internally-generated control numbers. The control number is used for system identification and searches. You can sort by the first two names together and zip code. These features are stan-

dard, but speedy access time makes the difference with this software. Control-number access is instant.

Information Unlimited Software's **EasyMailer** is designed to work primarily with its EasyWriter word-

processing package, but it functions very well on its own. It is a flexible package and is easy to use. You set up a format with a "design" function and can use up to 36 fields, but the

continued on page 142

	Software Comparison Chart														
	Software Comparison Chart														
	Software Comparison Chart														
	APPLE COMPUTER	CHARLES MANN	COMPUTER HOUSE	DR. DALEY'S	D.B. SOFTWARE	DYNACOMP	INFORMATION	MICRO BUSINESS	NORTH STAR	PEACHTREE	PRODIGY	STONEHENGE	SYNTHETIC	SYNTHETIC	SYNTHETIC
	APPLE COMPUTER	APPLE III MAILING	AND ASSOCIATES	SOFTWARE	SOFTWARE	SOFTWARE	UNLIMITED	SYSTEMS	INDUSTRIES	COMPUTER	SOFTWARE	SORCERY	SOFTWARE	SOFTWARE	SOFTWARE
	APPLE COMPUTER	APPLE III	MAILING SYSTEM	DR. DALEY'S	D.B. SOFTWARE	DYNACOMP	INFORMATION	MICRO BUSINESS	NORTH STAR	PEACHTREE	PRODIGY	STONEHENGE	SYNTHETIC	SYNTHETIC	SYNTHETIC
	APPLE COMPUTER	APPLE III	MAILING SYSTEM	DR. DALEY'S	D.B. SOFTWARE	DYNACOMP	INFORMATION	MICRO BUSINESS	NORTH STAR	PEACHTREE	PRODIGY	STONEHENGE	SYNTHETIC	SYNTHETIC	SYNTHETIC
Fields/Lines:															
—Maximum no.	8	6	6	10	9	10	6	9	36	8	12	7	6	12	8
—Comment/Codes	2	2	2	2	4	3	2	2		2	2	2	2	1	1
—Category>Select														8	
Posting:															
—Automatic	●	●							●		●	●	●		
—Batched				●	●	●	●	●	●	●				●	●
—Other															●
Zip Codes:															
—5-digit only			●		●	●				●	●	●			
—9-digit	●	●		●			●		●				●	●	●
—Foreign allowed								●						10	
Merges form letters				●		●				●		●		●	●
Printing Labels:				●	●	●	●	●	●	●	●	●	●	●	●
—All	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
—Alphabetical		●						●		●	●	●	●	●	●
—Merged letters			●		●				●	●	●	●	●	●	●
—Selected records	●			●	●	●	●		●	●	●	●	●	●	●
—Zip Code order	●	●		●		●		●		●	●	●	●	●	●
—Envelopes					●								●	●	
—Return address													●		
—Automatic screen									●				●		
—Telephone List	●	●													
—Master List	●	●											●		
—By codes			●		●		●			●	●	●	●	●	●
—Every Nth record						●									
—Group search						●									
—One line across													●		
—All current															●
—All on disk 1															●
—All on disk 2															●
—All on both disks															●
Labels:	1	4	3	2	9	8	3	6	4	1	4	6	3	6	5
—Max. no. across	6	6	6	8	6	10	5	15	36	4	12	7	5	4	4
—Maximum lines														10	6

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Energy analysis

continued from page 71

area of its windows. The tenant determines the thermostat set points, based on what feels comfortable, and shares the responsibility for appliance-heat gains with the builder.

SUNDAY will run on several different personal computers. A version for the Apple became available in October. SUNDAY is written in—and therefore requires—the programming language UCSD Pascal. The software costs \$495. Packaged weather data for Seattle and Yakima, Wash., Portland, Ore., Albuquerque, N.M., and Madison, Wis., are included; for other sites there is an additional fee.

SUNCODE, the more advanced energy-analysis program, costs approximately \$1500 and runs in FORTRAN. Details are available from Ecotope Group, 2328 East Madison St., Seattle, WA 98112.

But if some solar architects have their day, the use of the personal computer will not be limited to simply designing the solar home. They intend to put the machine to work monitoring and controlling the operation of the passive energy system itself. Homes driven by personal computers are still on the farther reaches of reality, but experimental versions are beginning to appear. One of the better examples is the Ahwatukee House of the Future outside of Phoenix, Ariz.

A roadside attraction

Actually the Ahwatukee is a modern-day version of another roadside attraction. It was conceived by a contractor as a means of luring outsiders into the area. They come to gawk at this futuristic home—and then he shows them other "normal" homes that he has for sale.

Built with the aid of the Motorola Semiconductor Group, the Ahwatukee House is made of thick poured

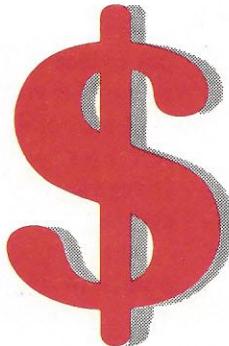
concrete used as a passive solar thermal mass. It is circular in design and is powered by five 8-bit microprocessors supplied by the electronics firm.

The computers constantly monitor, through distributed sensors, the temperature in the solar collectors, the position of the sun, the heat needs for various portions of the house as well

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HOME COMPUTING

as the water system and the swimming pool. With this information the computer runs the house, telling which heat, and how much, goes where.

Giving instructions

The program for Ahwatukee, called Tukee, is written in PASCAL, but the homeowner need only give the computer instructions—such as which lights should be on, what temperature the house should be, etc.—in English to run the system.

Even those who created Ahwatukee concede that the home's cost—approximately \$2.5 million—and technical problems make it not the home of the present. They add that despite its experimental nature, solar energy has been given increased credibility by the potential of Ahwatukee.

"It is a fairly complicated system

with which we're working," says Gary Kloesz, a Motorola engineer who worked on the project. "But even though we're far away from mass

producing these homes, we've ironed out most of the problems so that even now it works worse than a television, but better than a car."

Tracking those accelerating car costs

J.F. Sullivan

With the price of gas what it is, everyone is interested in finding ways to reduce the cost of operating a car. This TRS-80 Model I program will not reduce the cost of driving, but it will make you aware of how much each mile of driving costs. It will also tell how your miles-per-gallon change as you alter the way you drive and maintain your car.

The program gives four main points of information: miles-per-

gallon, miles-per-quart of oil, cost-per-mile to operate the car and when the car's next oil change is due. Through the use of a data file stored on the same cassette as the program, records can be kept for the lifetime of your car. With an average oil change interval of 5000 miles, the program has room for the first 125,000 miles of your car's life.

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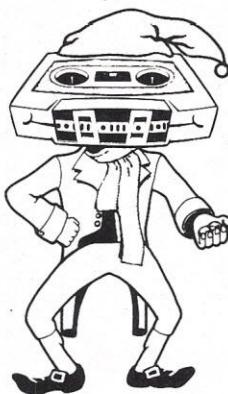
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time the oil is changed, the information since the last change is computed and stored. By comparing results at each oil change, the effects of a tune-up, of changing types or brands of oil or gasoline and of changing your driving habits can be seen.

The program guides you through the use of the cassette recorder when the data file is read and again when it writes the updated file back to the tape. The main part of the program is a series of questions such as, "Did you fill up with gas? Did you add oil? Did you change the oil?" If you answer yes to the first question, for instance, it will ask further questions on the cost of the gas and how many miles-per-gallon you got from it. Each time the computer is given new data on gasoline use, it displays the miles-per-gallon (MPG) for the preceding tankful, and cumulatively for

the entire period since the last oil change.

Expenses, expenses

The final question in the main part of the program is "Any other ex-

After the program is updated with all the new entries, the data file must be sent to the cassette. The program directs you with step-by-step instructions on how to accomplish this. There is also the option of writing a

"I can see just from the miles-per-gallon figure on the computer that it's time for a tune-up. The figures also convinced me not to drive at 70 mph."

penses?" Here you enter repairs and maintenance other than gas and oil. You make the decision as to how much of the total costs of your car to enter. If you consider insurance premiums or car payments part of the auto's operating cost, then include them in this section of the data bank.

backup copy of the data. It would be a good idea to do this, if not every time, at least at every oil change.

At the end of the program the series of records on your car are displayed. (See figure 1.) You will sometimes see one of the MPG figures marked as "tentative figure."

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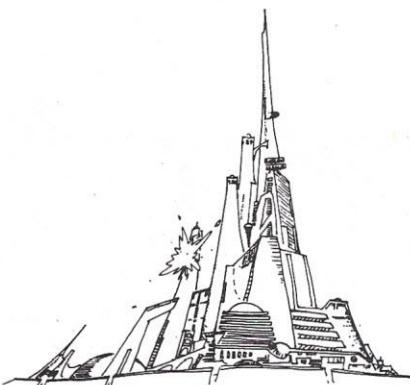
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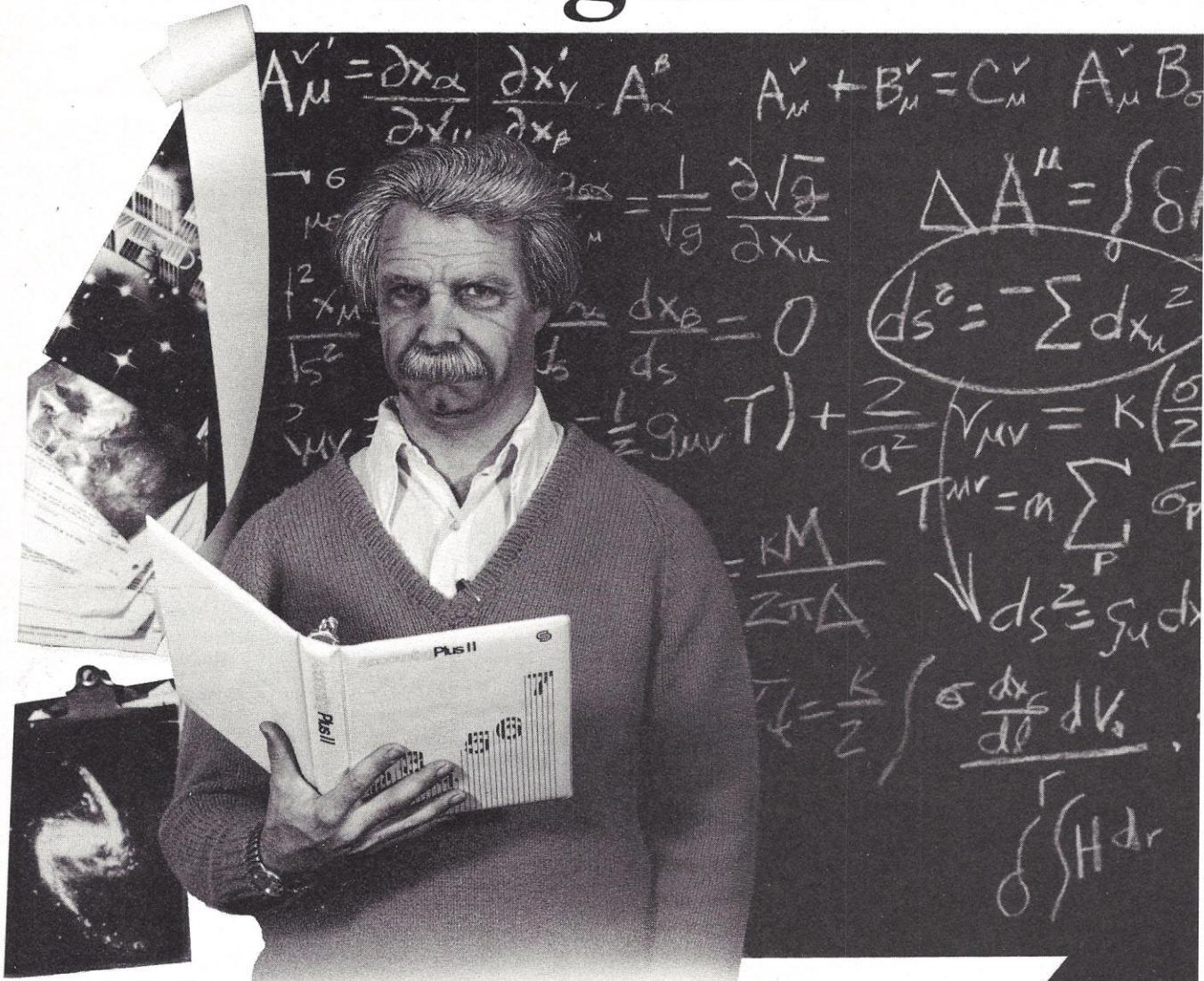
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This is due to a routine in the program that is used to make the figures as accurate as possible. If you did not fill with gas at an oil change, some of the gallons in the next gas fill should be considered with the previous cycle, while the rest should be included with the present cycle. The program cal-

culates these gallons and corrects the figures at the first gas fill after an oil change.

A small reminder

One main feature of the program is its reminder of when the next oil change is due. When you initialize

the program, input the desired time and mile intervals between oil changes. These set intervals can be altered later if you change your mind.

Before running the program for the first time, the data file on the tape must be initialized. The program is set up for the data file to be five tape-counter units behind the program. (You could put the file at some convenient number like 50 or 100, or even on a separate tape.) To initialize the file, set up the recorder for WRITE (push play and record), and enter the following direct statement: PRINT#-1,0,0,0,0,0,0,0

The first time you run the program you have to answer several questions concerning present mileage, present date and how often you plan to have the oil changed. Thus, for cycle accuracy it would be best to start using the program at the time you have an oil change and fill with gas. It won't do any harm to start at some other time, but the figures for the first oil-change cycle will not be as accurate.

In running the program, keyboard entries for how much gas and oil was put in the car, mileage numbers, dates and cost figures are always input as numbers. Replies to non-numerical questions, those that are answered yes or no, are input with a 'Y' or 'N.' The prompt for these is '(Y/N).' In addition, when the computer finishes some operation and is ready to continue, it asks 'Ready?' You need only push 'Return' to continue.

Fill it up

It might seem a bother to run the program every time you buy gas. You might be tempted to wait and enter several gas fills at one time. However, I can see just from the miles-per-gallon figure after each gas fill if it is time for a tune-up. I'll usually see a drop of about 1.5 or 2 MPG if I've waited too long.

The program also convinced me not to drive at 70 mph—as it works out, my car seems to be most efficient at about 60 mph.

Figure 1

Car Records

CYCLE	SRT MILE	SRT DATE	TOT MILES	MPG	COST/MILE
1	1	1/01/79	4800	22.57	\$.18
2	4800	5/26/79	4500	24.89	\$.16
3	9300	11/17/79	5200	23.65	\$.15
4	14500	3/16/80	4800	22.89*	\$.14
5	19300	6/27/80	0	.00	\$.14

* = TENTATIVE FIGURE

The cycles are the oil-change cycles. (The cost figure is cumulative. It is not the cost during that cycle but the cost-per-mile from the beginning of the program to the end of that cycle.)

Figure 2

Variables used

C	Cost entry
C5	Total cost since M9
D	Date entries
D1,D2,D3,D9	Date-print variables
D5	Oil-change interval, months
F	Mile-input check flag
G	Gas input
G2	Oil-change gas ratio
G1,G8,G9	MPG-display flags
H	History array
H(.0	Gallons used
H(.1	Quarts used
H(.2	Total miles
H(.3	Start mile
H(.4	Start date
H(.5	Cumulative cost per mile
I	Number of cycles (start at 1)
L	Record display line counter
M	Mileage entry
M1	Last mile entry
M2	Miles last tankful
M3	Miles since last change
M4	Last gas fill
M5	Last oil change
M6	Miles this tank during last cycle
M8	Oil change interval, miles
M9	Program start mile
N	Cycle pointer
O	Oil input
R	Ratio gas used last oil cycle
R\$	Response
T	Tape counter reminder
X	Change flag
Y	Oil added change flag
Z	Initialization flag

Investment management

continued from page 40

would take me well over a week to do with a pencil," says Reiback.

Besides developing charts and graphs for himself and his clients, Reiback shares his findings with the audience of "The Commodity Club Show," a weekly program broadcast Sunday evenings by Manhattan Cable Television.

The data that Reiback collects to calculate his ratio comes from his membership in the Personal Computer Technical Analysis Group. Tim Slater, the Group Coordinator, says, "Our analysis starts when people place their bets. If a company controller sees a big contract coming, he tells his friends and they buy stock. This is reflected in the numbers we work from."

Slater was among the original group of four technical traders who

recognized the potential of the personal computer for preparing the charts and studies that are the basis of technical analysis. In 1979, he began working with Dr. Jim Schmit, a professor of computer science at Loyola University. Schmit turned the group's technical-trading concepts into programs for the Apple.

Over the next few years the group expanded rapidly and now has 1050 members. The members receive the largest integrated collection of commodity and stock programs for the Apple, called Compu Trac.

Slater expects 1000 new members to join the analysis group this year. "About 30 percent of our members are brokers or brokerage firms and the rest are doctors, lawyers and other professionals," he says.

The group began working with

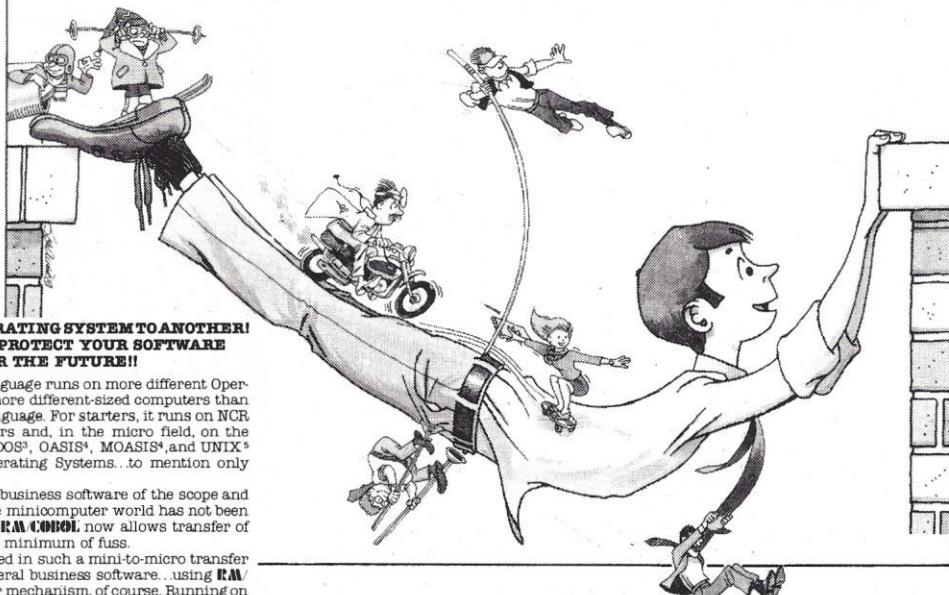
commodities information. Last year they expanded Compu Trac's programming capacity to include stock and option data.

Interactive Data Corporation also offers a service for the technical analyst called IDC PRICE. It provides both current and historical data on stocks and options via a personal computer.

According to Product Manager Edward O'Rourke, Jr., the service enables users to "retrieve historic prices and to set up, store, modify and price portfolios." Access to IDC PRICE is provided on a dial-up basis.

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"The VisiCalc program dramatically changed the attitudes of fundamentalists toward the personal computer," says John McMullen of McMullen and McMullen, a consulting firm specializing in end-user support within the financial community. "I've had a fundamentalist tell me that in running one security through a VisiCalc program, he saw a pattern that led him to sell early, a pattern he would not otherwise have seen. The fied the cost of a string of Apples," he says.

savings on that security alone justifies

Joe Scarella, an information manager with Morgan Guaranty Trust, says his firm's nine Apples are used with VisiCalc programs to build the models they use in corporate research.

"The analyst who has no computer sophistication can get right down to model building with VisiCalc," Scarella says. "He doesn't have to deal with the pitfalls of user syntax. Also, the self-contained aspect of the personal computer goes a long way toward alleviating the fear that many analysts have of using outside time-sharing systems."

"There are a lot of repetitive tasks in analysis," says Alice Bradie, a senior analyst with L.F. Rothschild, Unterberg and Towbin. "I use both the VisiCalc programs and the Magic Window word processor to free me

from those repetitive tasks." Whenever Bradie does direct research on a company, she brings a 20- to 50-page questionnaire with her. "Without the personal computer, it used to take me three days to prepare the questionnaire. Now it takes me a day.

"I'm a believer," says Bradie. "VisiCalc and Magic Window have made a different course of action possible in my research, resulting in a different product."

Editor's note: The investment methods presented here are designed to assist people in making their own decisions in connection with investments. There's no magic in these methods. Any stock-market results which may have occurred in the past may not recur in the future. It is always possible that some unforeseen factor or event may be present.

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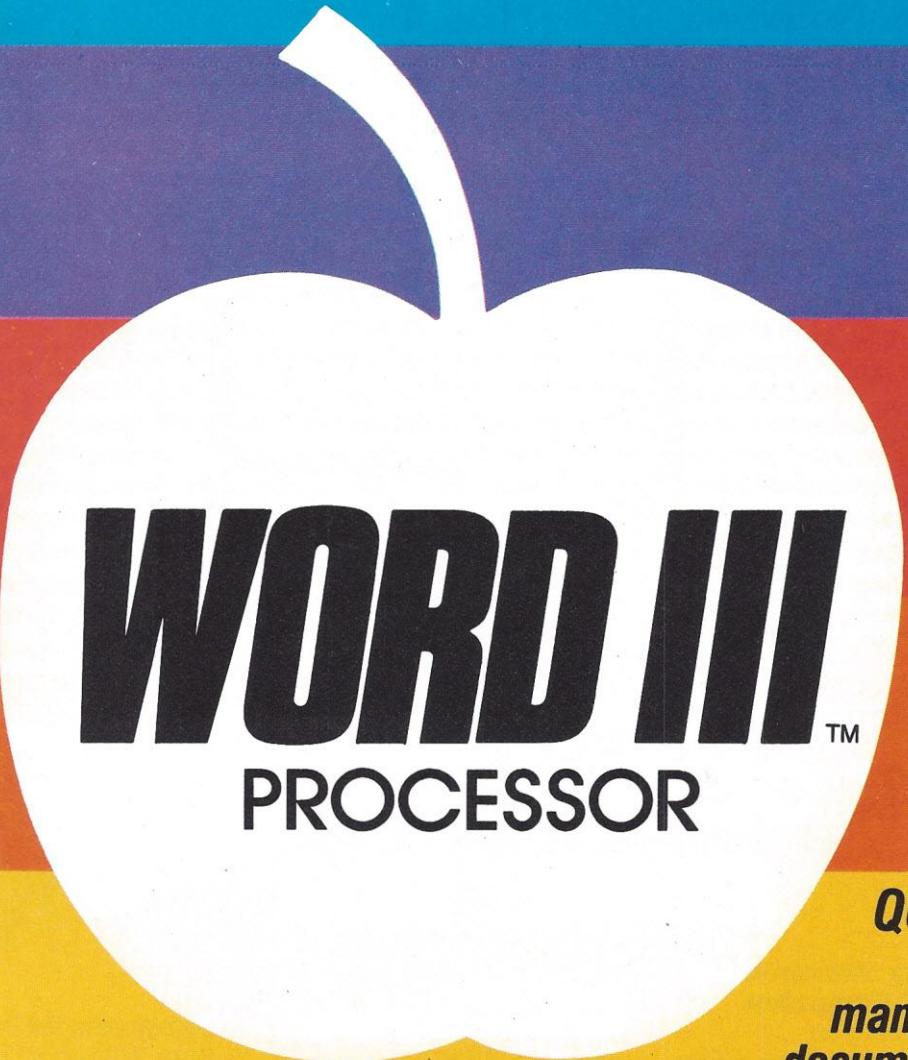
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High-level languages

continued from page

check out small chunks of code at a time. The compiled source code is reduced to a series of machine-language calls to the core routines of Forth. So for many applications the speed of executing a Forth program is sufficiently fast so that machine code isn't needed.

Public-domain, source-code listings for the figForth (Forth Interest Group) package are available for \$30, including an installation manual. Mountain View Press supplies figForth on disk for many of the popular personal computers such as the Heath/Zenith H-89 and the Atari. With manuals, figForth costs under \$100.

Forth is both a high-level language and an operating system. Most implementations use a built-in Forth operating system. The space normally occupied by a regular operating system (eight to 16 kbytes) isn't needed. Typically, the complete Forth package—and reasonably sized applications programs—run in 16 kbytes of RAM.

Complex COBOL

COBOL was developed for business use. It's an old language and suffers from a lack of development that marks the sophisticated high-level languages of today. COBOL is compiler based, but its complex formats use large amounts of memory. For a personal computer with a small amount of memory, COBOL may not be a good choice.

One advantage of COBOL is its programming clarity. The long definitions and keywords make for a clear program that's easy to understand and modify. Another advantage is the vast amount of available COBOL applications programs.

The prices for COBOL packages are generally between \$200 and \$850. Then you must add another \$200 for a sorting package. For a small-business machine the cost of a COBOL package can run even higher.

C stands for language

The C programming language is popular with engineers who develop systems software. The most visible form of C language system software is the Unix operating system written at Bell Laboratories.

A key feature of the C language is its portability. Source code written in C, like Unix, can be put on almost any type of hardware. All that's needed is a C compiler for the target computer. Simply run the C-language source code through the compiler and, assuming basic hardware features like terminals and disks are the same, the program is ready to run with little or no change.

The C language is not yet a real factor for personal computers. The most popular C software available is Tiny C from Tiny C Associates.

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CIRCLE 37

OUTLOOK

continued from page 16

other Turtle Learning Centers around the country as our new organization gains momentum. We like to think we're an idea whose time has come."

Lifeboat plugs "standard" OS

Lifeboat Associates, in a move that president Tony Gold describes as, "not very risky, backing IBM," recently announced that it will market SB-86, an operating system functionally identical with MS-DOS (from Microsoft) and PC-DOS (from IBM). All three will then be able to run on the IBM Personal Computer and functionally identical machines that are expected to appear soon.

Individuals shouldn't expect to be able to buy the system immediately, as the initial target customer is the original-equipment manufacturer. This operating system will, if Lifeboat is correct, soon begin showing up in complete turnkey systems sold to end users.

PC-DOS is the operating system that IBM sells as the standard OS for its personal computer. Developed by Microsoft of Bellevue, Wash., the operating system is said to offer easy conversion of programs that run under the popular CP/M operating system from Digital Research. CP/M is also offered by Lifeboat.

SB-86 has many features that make it desirable. It is written entirely in 8086 assembly language. This means it has speed and efficiency advantages over other systems that have been translated from 8-bit counterparts. (The operating system can use 8086 assembly language even though the processor in the IBM Personal Computer is an 8088. This is possible because both processors execute the same instruction set.)

SB-86 also has no 64k program-space limitation, although no single program module can be larger than that size. A relocatable linking loader can provide for separate program segments. The OS has no file or disk-size limitations, unlike CP/M, which is limited to 8 Mbytes. Thus SB-86 users don't have to break a 24-Mbyte disk into three separate logical disks to interface with SB-86, as would a CP/M user. The OS also has variable disk-sector size, so hardware interfacing is eased. Disk-using programs can specify any logical record size, providing an

efficient system for large-file handling programs like data-base management systems.

For more information, contact Lifeboat Associates, New York, NY 10036; (212) 860-0300.

What's new in Japan?

Think of a four-pound computer with a full-size keyboard, four-line display, tape-drive memory, printer and enough computing power to make it really useful. Then price it below \$1000. This and many more new products awaited the swarms of people who attended this year's Japan Data show in Tokyo.

Major exhibitors included NEC, Toshiba, Sharp, Hitachi, Fujitsu, Panasonic/Matsushita, Casio, Sony, C. Itoh and Epson. New personal computers were shown by many of the companies, along with products from companies like Aval and Anritsu, which as yet haven't established a presence in the American marketplace.

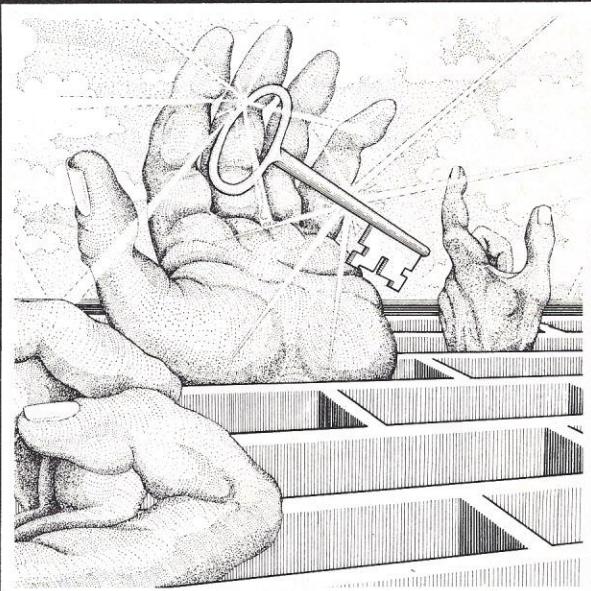
Before deciding to wait for these products to show up on American soil, consider how differently the Japanese see and do things. Michel Burton, a Yokohama-based computer marketing consultant, has lived in Japan six years. He spoke with some of the visiting Americans on how the Japanese do business.

Burton said that a Japanese employee is likely to spend his working life with one firm, but an American computer firm stands to lose about a fifth of its professional staff each year. So Japanese managers feel little pressure to get new products out in the market before they've been thoroughly developed. Japanese companies thus move slowly by American standards. You can't time Japanese product introductions with an American watch.

Slow or not, the success of a company like Toyota is typical of Japanese business. The firm sells a car devoid of new ideas, and auto-enthusiast publications find it difficult to write interesting reports on Toyotas. But every year the cars get better and a little more refined. Every year the car exhibits Ford prices and Mercedes reliability. It is safe to assume that Japanese computer companies will bring the same principles to the computer they sell here.

This puts the four-pound computer and such products at the Data Show into perspective. New products may appear at shows, but Japanese firms

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	10 Hard Sector, w/Hub Ring	3433	2.14	—	—	—	—	—	—	—	—	—	MD525-10	—	—
	16 Hard Sector, w/Hub Ring	3435	2.14	—	—	—	—	—	—	—	—	—	MD525-18	—	—
Mini Flexible Disc 1d	Soft Sector (Unformatted)	3417	2.14	—	54646	104/1D	—	—	—	—	—	—	MD525-01	—	—
5 1/4" Single-Headed Drives	10 Hard Sector	3418	2.14	—	54649	107/1D	—	—	—	—	—	—	MD525-10	—	—
Double-Density Media	16 Hard Sector	3419	2.14	—	54652	105/1D	—	—	—	—	—	—	MD525-16	—	—
	Soft Sector (Unformatted) w/Hub Ring	3481	2.34	—	—	—	—	—	—	—	—	—	MD525-01	—	—
	10 Hard Sector w/Hub Ring	3483	2.34	—	—	—	—	—	—	—	—	—	MD525-10	—	—
	16 Hard Sector w/Hub Ring	3485	2.34	—	—	—	—	—	—	—	—	—	MD525-18	—	—
Mini Flexible Disc 2d	Soft Sector (Unformatted)	3421	2.59	—	54624	104/2D	—	—	—	—	—	S/A-154	—	MD550-01	—
5 1/4" Double-Headed Drives	10 Hard Sector	3423	2.59	—	54627	107/2D	—	—	—	—	—	S/A-157	—	MD550-10	—
Double Density Media	16 Hard Sector	3425	2.59	—	54630	105/2D	—	—	—	—	—	S/A-155	—	MD550-18	—
	Soft Sector (Unformatted) w/Hub Ring	3491	2.79	—	—	—	—	—	—	—	—	—	MD550-01	—	—
	10 Hard Sector w/Hub Ring	3493	2.79	—	—	—	—	—	—	—	—	—	MD550-10	—	—
	16 Hard Sector w/Hub Ring	3495	2.79	—	—	—	—	—	—	—	—	—	MD550-18	—	—

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OUTLOOK

will deliberate and deliberate before the company's officers decide—as a group—to actively market those products here. They'd prefer to see them a success on the home market before selling abroad.

While the Japanese are deliberating the sale of computers in the U.S., American computers have achieved some popularity in the Japanese arena. Apples, TRS-80 personal computers and Commodore computers are available in Japan with Japanese characters and English letters together on the keys. There are also some corresponding changes in the hardware to support both character sets.

This implies that American and Japanese hardware are close in quality, and several Americans at the show said the technology was generally a toss-up as far as production machinery was concerned.

Not that American companies can just lean back. The Toyota of personal computers could be pretty devastating in the American marketplace. But the latter machine won't be obvious at a trade show. Its presence will be quietly felt in areas like reliability, cost-effectiveness, service and software availability.

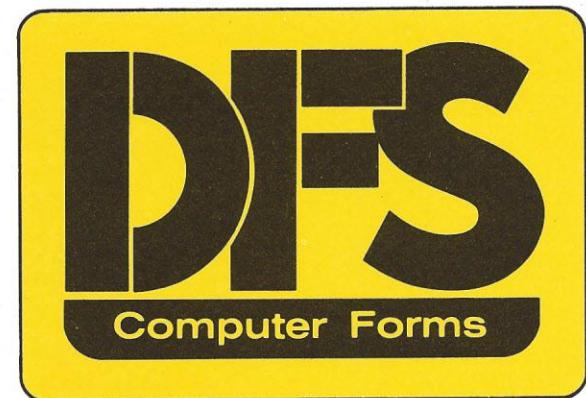
Americans curious about seeing what the computer might be would be well advised to visit the Akihabara. This five-block square district of Tokyo is almost exclusively devoted to electronics and electrically driven devices, from shavers to washing machines to computers. There are literally dozens of computer stores in the Akihabara, all within walking distance of each other. Here you can see what makes and models are currently doing well in Japan. The most prominent machines are from NEC, Sharp, Hitachi, Casio, Fujitsu and from American makers like Apple, Commodore and Radio Shack.

Toshiba is already in this country with about a dozen dealers showing several computers aimed at small businesses, and it showed a small computer at the show that could be the beginning of a product line with wide appeal. Just when Toshiba's—or any other Japanese company's—management will decide to bring it to this country is problematical.

The bottom line? The Americans visiting the Data Show saw a number of machines which may be related to a number of computers you may be considering for your purchase-after-next, several years down the line. The handful of products that

Small Business Systems User!

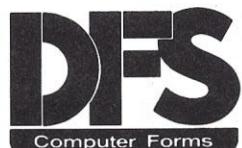
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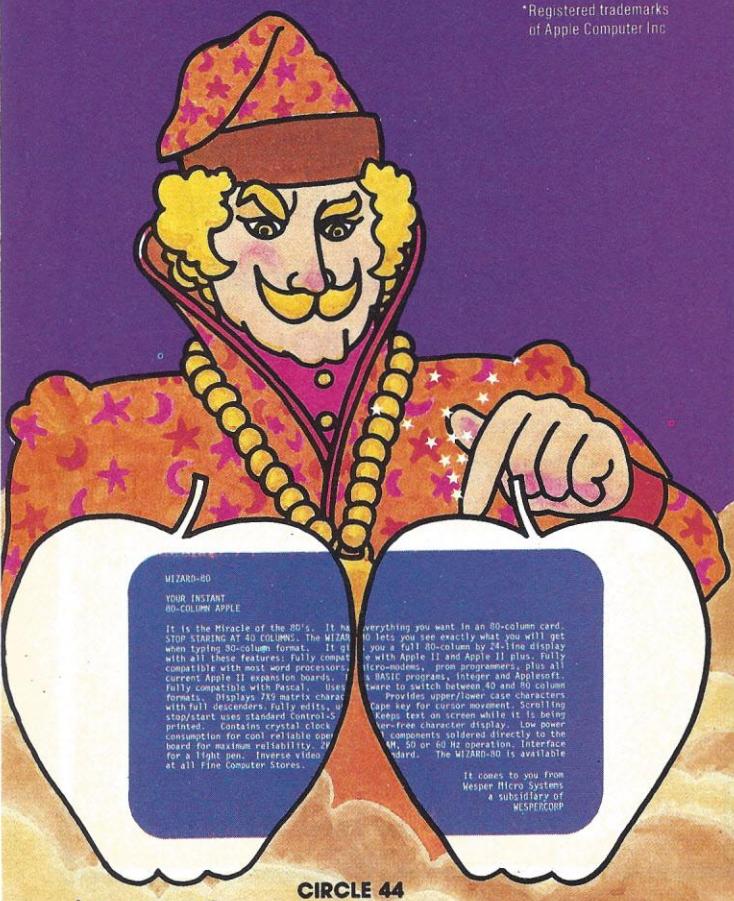
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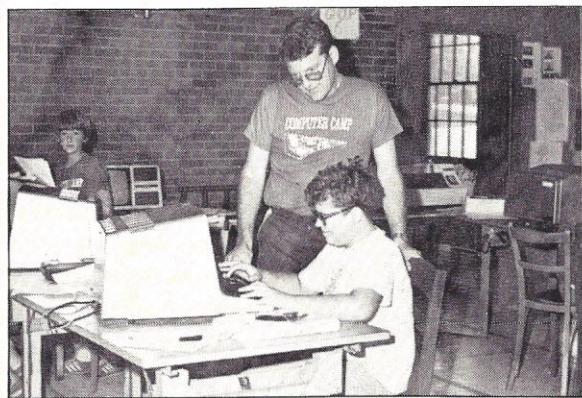
OUTLOOK

will be successfully imported to the U.S. will be very good indeed. Americans can look forward to the coming competition between Japanese and American companies being good for the average buyer.

So what's new from Japan?—refinements and possibilities.

What to do with the kids

This summer, youngsters can again sign up for a camp where the main activity won't be swinging a baseball bat or splashing in a pool, but rather experiencing computers. This unique recreational and educational experience will be held at two locations: Atlanta, Ga., and Simsbury, Conn. The camp is directed by Dr. Michael Zabinski, Professor at Fairfield University. Now in its fifth year, it is the original computer summer camp currently offered in the U.S.



The 1982 National Computer Camp will feature sessions from July 11 to August 6. Campers, ages 10-18, may sign up for one- and two-week sessions. The campers will enjoy small-group instruction and dozens of computers for ample hands-on experience. Dr. Zabinski will be assisted by elementary- and secondary-school teachers, all with extensive classroom experience in computer instruction.

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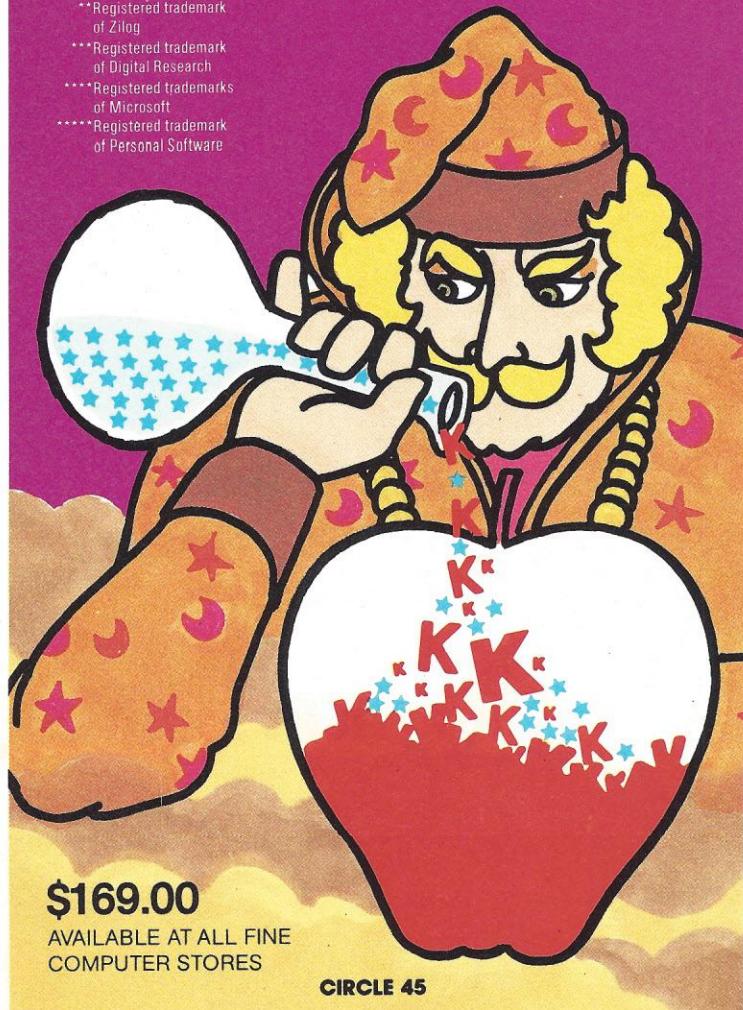
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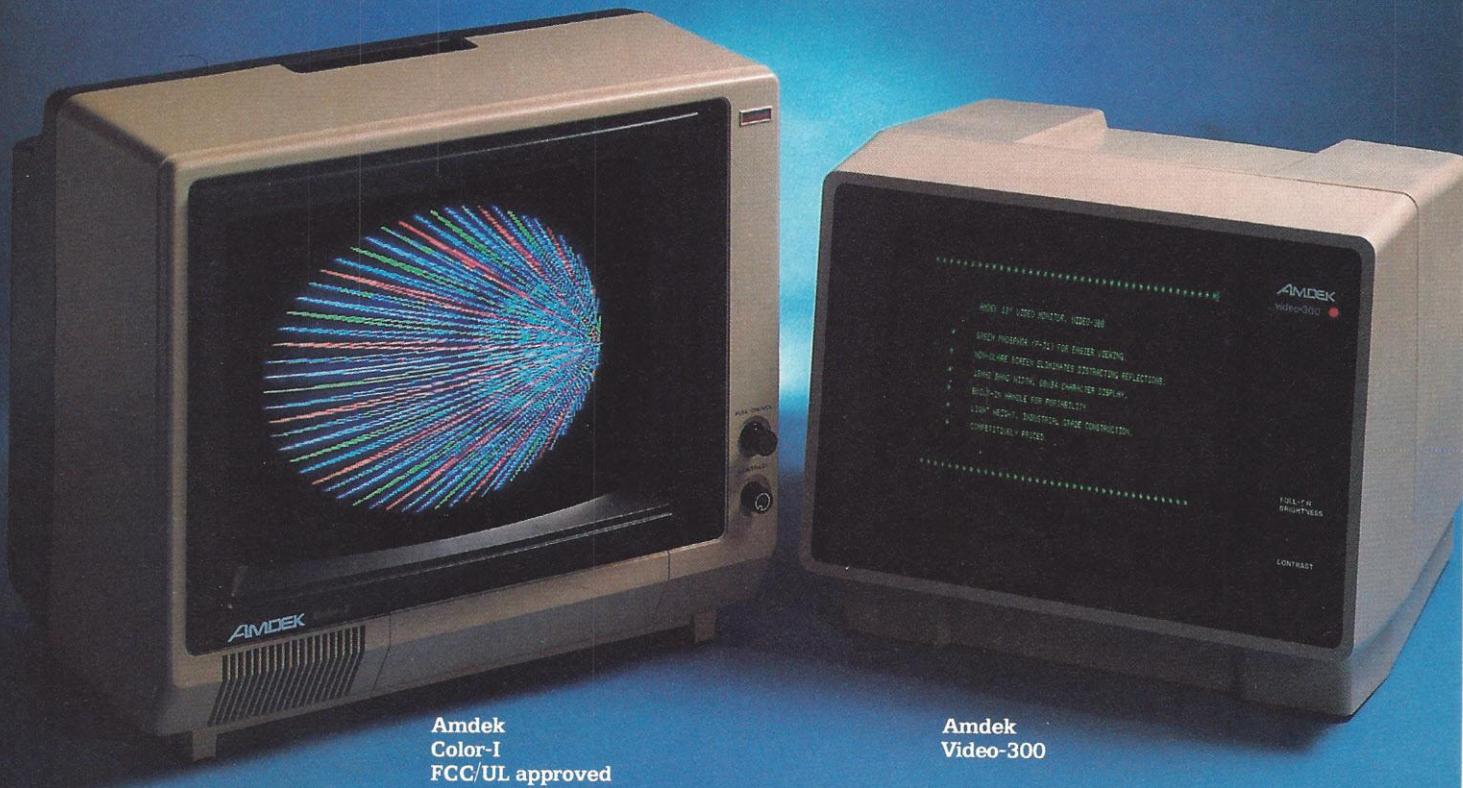
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DEALER'S DIGEST

Selecting your computer and your computer dealer

Editor's note: The following column, written by personal-computer retailers, will appear periodically in Personal Computing in answer to our readers' requests for information on how to buy what, and from whom. Reader comments on successful ways to purchase, expand or upgrade a system are invited.

How are people buying personal computers these days? They're demanding quality. The mild recession experienced in 1980 has conditioned many shoppers to look for good value in their purchasing. Buyers have been stretching their expenditures by making more purchases of higher-quality products and less purchases of inferior products. Even the well-heeled customer will continue to seek quality and convenience at the "right price."

Smart consumption has replaced the conspicuous consumption of the 70s. And a predicted double-digit inflation rate of close to 14 percent in 1982 will veer many more consumers toward the value-seeking path. This shopping trend applies to all kinds of purchases, including personal computers.

Entering a computer store for the first time can be interesting, frightening and informative. It is interesting because computers have become a major factor in business, government and education. The computer is able to do work in minutes that used to take years. Millions of pieces of information move across oceans and continents in a matter of minutes. Computers can open doors that would have otherwise remained closed for centuries.

Although interesting, initial visits to computer stores can be frightening as well. A friend of mine was upset by the treatment he received at some of the computer stores around town. He was particularly horrified at a specific shopping experience: Upon entering a store to inquire about a computer for his home, he found a salesclerk

at the counter midway through a submarine sandwich. The salesperson refused to interrupt his lunch. Instead, he gestured toward a Commodore model stating, "That one over there is the best one for you." Needless to say, this was a frightening experience.

Most computer stores have very neat, courteous and well-informed personnel, who will ask many questions to find out what your requirements are. But most buyers are intimidated when asking questions that they feel are stupid; hence, they might not ask them.

Consumers must remember that buying the right computer to get a job done is far more important than being afraid of asking the right questions. You must ask questions to fully understand what your needs are, and what the capability and expandability of the computer you're intending to buy is.

Visiting a computer store is also very informative. Computers have keyboards and buttons, things called modems, printers and interfaces—all of which raise a lot of questions to the uninformed. All of these questions should be fully explained to your satisfaction before you say, "I'll take it."

The number of computer dealers has skyrocketed. Estimates of the numbers run as high as 3000 to 4000—up three times from a year ago—and are expected to double again this year. In addition to the specialty computer dealers, department stores, big national chains, audio merchants and discount appliance houses are jumping on the fast

moving, high-volume computer bandwagon.

How to buy

The best way I found to buy something is to shop for it. Shopping takes time and effort, but the justification is in the reward. When you shop for a major purchase, look for three basic

things: selection, service and price.

- Selection: Being informed of technological breakthroughs, manufacturers' promotions and strategies, along with just plain knowing who's selling what, keeps the successful buyer on top of the buyer's market. How can you do this? Keep abreast of the personal-computer

market by reading about it.

- Service: This can be one of the most frustrating experiences of buying. Now you've bought it. You know what to do with it, you're ready to use it, but it doesn't work. This is when service from your dealer really counts. Can he fix it, or do you have to find a big box, pack it up and haul it over to the post office or the nearest truck driver? Do you send it half-way across the country to wait six to 10 weeks to find out it still doesn't work?

The man who sold you the computer should also be the man who will fix it if it breaks. He is your computer specialist. He made the profit on the sale, and he should therefore ease any pains that go along with it. Down time can be very costly and can be avoided by having access to a qualified service center.

- Price: "You get what you pay for." If you do your homework and are up to date on what you're buying, you should be able to buy it at the right price. Catalog houses give you the right price, but offer no help, selection or service. Elite computer stores offer selection and service, but the price is often off the wall.

By visiting enough stores you will learn what to buy and from whom you should buy it. Allow your computer dealer to make a fair profit and he will do all that he can to help you now and in the future. He wants your business, and more importantly, he needs it to survive. Referrals are the best sales leads because they are a personal recommendation. A dealer will do all he can to get them.

Remember that a personal computer is an investment in equipment. You get out of it what you put into it. Therefore, make sure you select the right one, you can get it fixed and you pay the right price.



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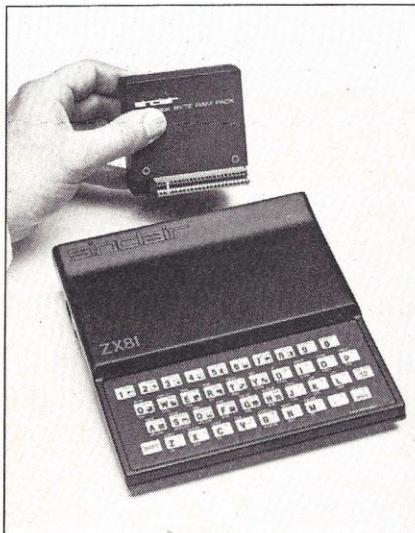
January 1982/Personal Computing

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3208

The ZX81: upgraded computing power

Situating his product at the low end of the personal-computer market, Clive Sinclair, president and founder of Sinclair Research, has come out with an updated and upgraded ZX81.



Shown with the optional 16k RAM module is the Sinclair ZX81. The basic unit is priced at under \$150 in complete form and under \$100 in kit form.

Sinclair says his low-priced personal computer, which was introduced at a recent Boston press conference, is aimed at the "man in the street."

He describes the average user of his system as "a person who wants to learn what computers are about, not necessarily because he's going to use them (computers) personally... It's because he wants to understand how they work."

What Sinclair is describing is the new version of last year's low-priced ZX80. The older unit had come

under criticism from some quarters as having a limited display capability. The new version, which features an 8k basic ROM and is based on a Z80A 8-bit central-processor unit, will now compute and display at the same time, whereas the older unit could not.

The ZX81, which weighs about 12 ounces, takes advantage of very large-scale integration in the new master chip. This new CPU chip, developed by Ferrante in Britain, has enabled Sinclair to replace 18 chips. There are now only four in the unit.

It is not available with any dedicated video-display unit. Instead it relies on a built-in VHF rf demodulator to interface with a standard black-and-white television set. The display, which has graphics capability built around the TV's raster scan, is 24 lines with 32 characters per line. It can either be standard or reverse video.

Because it relies on this interface mode between the CPU and the display, the computer's line length is limited. It is based on the existing bandwidth of the television set. This interface should be more than adequate for the beginner, at whom Sinclair is apparently aiming.

The system can be upgraded with the addition of a 16k RAM module, which costs \$99.50. It is also available in either kit or assembled form. The kit lists for \$99.50, while the completed unit lists for \$149.95.

Sinclair sees the potential sales market for this unit in the U.S. as about the same as it is in the United

Kingdom, 20,000 a month.

One drawback many persons accustomed to typewriter keyboards may find is the plastic membrane keyboard this unit uses. Other computer manufacturers, such as Commodore and Texas Instruments, have tried this type of keyboard, but have met with little success. Those companies eventually changed to a full-featured keyboard. As one observer noted, this is one way to keep the cost of the unit down.

The pressure-sensitive 40-key keyboard does have the equivalent of 91 built-in functions. It also features single-stroke entry for such functions as peak, poke, list and run, which should make this computer an easy instrument for the beginner to use.

There is also a 164-page BASIC instruction manual available for the user who wants to learn programming.

Sinclair says that thanks to its extensive work with the British school system, where there are some 2500 ZX81s in use, an extensive foundation of educational software has been built.

The ZX81 has two operating speeds, normal and fast, which is four times the speed of normal. At the normal speed, the unit computes and displays simultaneously. This allows the user continuously moving graphics capability.

There will also be a low-priced printer available for the ZX81 sometime early in 1982. Priced at about \$99, this will be the only printer available for the ZX81. Sinclair says



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Transend comes in three different versions. You can begin economically with the simplest form, Transend 1, an intelligent terminal/file transfer system. As your needs increase, you can move up to two other Transend packages, without worrying about retraining or repurchasing. Transend 2 gives any Apple II intelligent terminal capabilities, plus file transfer with complete error detection and

automatic retransmission for demanding business applications. Transend 3 incorporates electronic mail—with password security, text editing, mailbox with mailstop, unattended scheduling and receiving, automatic redialing, and much more.



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CIRCLE 49

Transend's support of most popular Apple II "add-in" cards and modems lets you upgrade your Apple without hassle or unnecessary expense. And you'll immediately cut operating costs by as much as 30% with simple, easy-to-use menus, data compression and 1200-baud modem support.

Nobody on the personal computer scene today is offering the speed, flexibility, and reliability of Transend in a single upgradable software system.

Don't miss this chance to uplift your Apple II. Contact us or your dealer for all the delicious details.

SSM Microcomputer Products, Inc.,
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In addition to information retrieval, the VP-3501 provides full interactive communications with a host computer. What you have working for you is a versatile, feature-packed interactive data terminal which can be worth far more to you than its low price. Its unique color-locking circuitry gives you sharp color graphics and rainbow-free characters. You get 20- and 40-character formats in one of eight foreground colors and separate color backgrounds.

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See a demonstration at your computer or electronics dealer, or contact RCA. Order now and you'll get a free password and a free hour's time-sharing on both CompuServe and Dow Jones News/Retrieval! (Limited time offer.)

For more information or to order, call toll-free 800-233-0094. (In Pennsylvania, call 717-393-0446.) Visa or MasterCard orders accepted by phone. Or send a check including \$3.00 delivery charge plus your local sales tax to RCA MicroComputer Products, New Holland Avenue, Lancaster, PA 17604.

*Suggested User Price.

CIRCLE 115

RCA

HARDWARE

that his company would prefer users to stay with his printer rather than go elsewhere. It is a 50-character-per-second unit which is capable of printing either the contents of the screen or the data that has been filed.

The upgraded computing power that has been incorporated in the ZX81 also allows multidimensional string and numerical arrays. Capable of mathematic and scientific functions, the ZX81 stores numbers in 5 bytes in floating-point binary form. The company says the math function is accurate to 9 1/2 digits and the computer can perform full-log, trigonometric and inverse functions.

Program loading is done through an integral serial I/O port which can be linked to a standard cassette recorder. A user can write, load and save his own programs, or he can use any of the six programs that Sinclair has available for \$9.95 each. There is no provision for the faster disk-type of program load. Users are limited to the slower cassette, even though the system will serially search a cassette for a specific program. Users can assign the programs specific names.

Some of the other functions included in the basic ZX81, which has 1k of static memory, include editing and automatic syntax checking of every statement line.

A compact unit, 6 X 6 1/2 X 1 1/2 inches, this personal computer is a little larger than an ordinary book. Although it is priced inexpensively, Sinclair claims it is a full-featured system. It is "not a reduced-support machine. The language it uses is complete," he states.

The company can keep costs down because it does only the tooling, development, technology and design work in-house. The manufacturing is done by outside contractors, such as Timex in Dundee, Scotland. Although Sinclair is expanding its software library, the company encour-



The New AIO-II.

Another winner from the folks who invented multi-function Apple interfaces.

SSM is still ahead of the game when it comes to the Apple IITM. Choose from any of four operating modes. And you're assured of flexibility at a price that spells big savings.

Check out why SSM spells success:

THE NEW SERIAL/PARALLEL AIO-II: this new full-function serial and parallel interface for the Apple II gives you true simultaneous operation. It's totally transparent to the user; there's no software to write, and no need to modify your computer. Advanced design techniques overcome the need for "phantom" slot assignments and related software compatibility concerns.

The AIO-IITM appears to application software as either an Apple communications card or parallel printer card. You don't have to worry about special setup requirements. Hassle-free, user-oriented AIO-II design permits easy selection of four functions: serial modem, serial terminal/printer, parallel Centronics printer, and general-purpose

parallel. On-board firmware provides all necessary drivers in a single package. Optional cables support Centronics-compatible printers and others.

You can remain in the game, too, with either our Serial ASIOTM or Parallel APIOTM boards—if low cost, single function's your style. Our ASIO connects your Apple to a modem with an optional terminal routine, or to a terminal/printer without modifying the cable. It

gives you standard RS-232 interface with complete handshaking. And selectable rates from 110 to 9600 baud. The APIO parallel interface supports general-purpose I/O and all popular Centronics-compatible printers, including Epson, IDS, Okidata, Anadex, and others.

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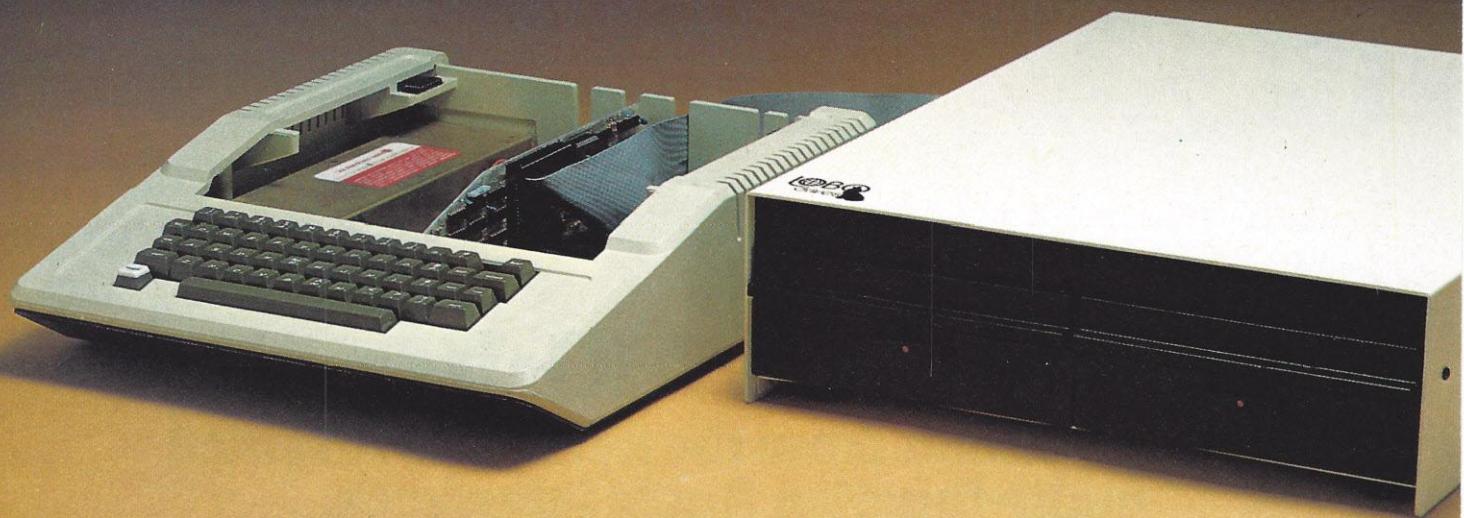


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HARDWARE UPDATE

ages outside software houses to write programs for the ZX81.

Sinclair normally markets its products by direct mail. But a retail chain in the United Kingdom and American Express have also recently begun to sell these computers.

Service is still handled by mail

with this Boston, Mass., and Cambridge, England-based company. Kit buyers should be aware that normal warranty procedures don't cover kit computers.

The unit comes complete with all of the necessary interface connectors for the video and cassette con-

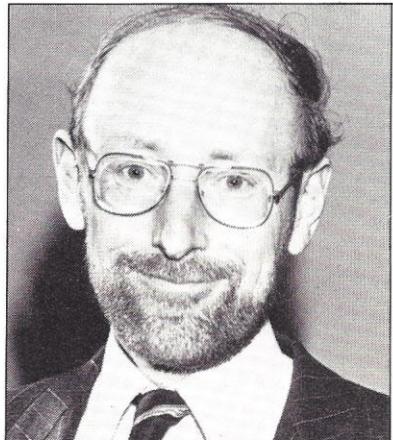
nections. It also comes with an AC adapter. The in-house programs available include business and household management, math and spelling education and games.

For more information: Sinclair Research, One Sinclair Plaza, Nashua, NH 03061. **CIRCLE 150**

The man behind the ZX81

Clive Sinclair, founder and president of Sinclair Research, could well be called a Renaissance man. He is the developer of the ZX81, although his formal education ended with his graduation from high school in Britain.

Self-taught in electronics, Sinclair began his career as a technical journalist in Britain. He spent four years in this field before he branched out and formed his own company, Sinclair Radionics. This firm dealt with radio kits.



It was from this firm that Sinclair began his career of

"technological firsts." He was able to push ahead with an idea. From this idea, the world's first pocket calculator was born in 1972.

Still in his 30s, Sinclair again broke new ground with the introduction of the ZX80 personal computer. It was the first on the market for under \$200.

Sinclair formed Sinclair Research in the late 1970s and has spent the last couple of years designing not only the 80, but now the 81, which is built by Timex in Dundee, Scotland.

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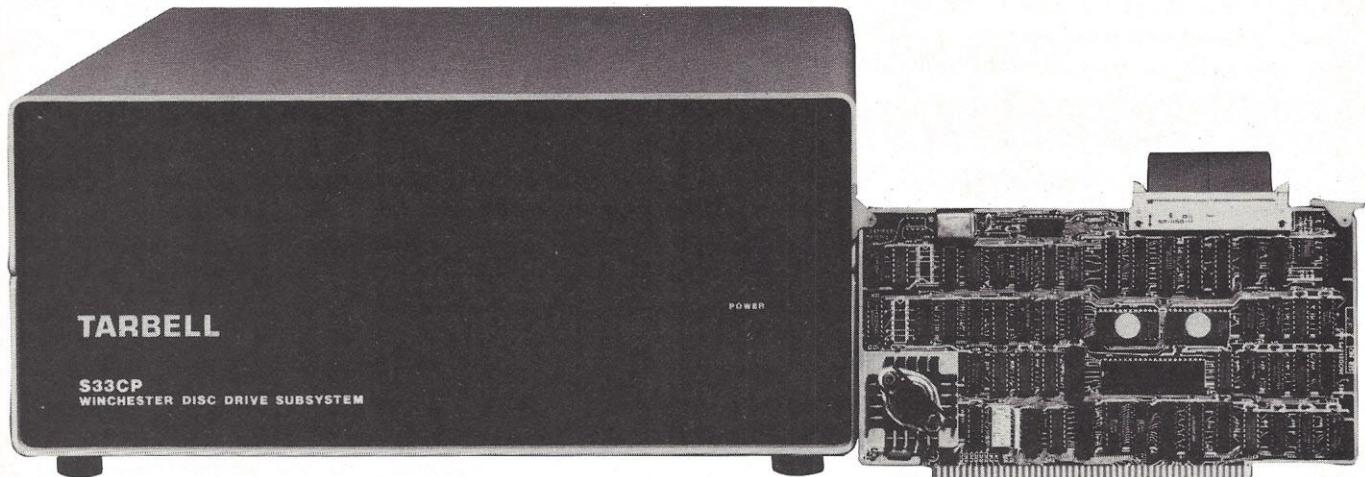
CIRCLE 52

January 1982/Personal Computing

117

S-100 Computer Owners...

Looking for more capacity, speed and reliability?



Tarbell 33 megabyte winchester subsystem

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Are you finding you need more disk memory for business applications? Tarbell's hard disk subsystems allow expansion from 10 to over 200 megabytes. And our ATTACH program provides a way to get up-and-running quickly. Start with a small system, if you like, then add up to four drives of any capacity.

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In most business applications, speed of the disk subsystem is the limiting factor for overall system speed. Major factors which affect disk speed are access time and data transfer rate. All Tarbell hard disk subsystems 33 megabytes and above use a voice-coil actuator which provides an average access time of 50 milliseconds. Data comes off the disk into your deblocking buffer at the maximum possible speed of 1 megabyte per second, meaning that a 24 kilobyte file can be loaded into memory in about one second!

RELIABILITY

Winchester drives have higher inherent reliability because the media and heads are in an air-sealed environment. Other types of drives are open to contamination from smoke, chemicals, and other particles in the air.

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- Uses only one S-100 board slot
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- Automatic alternate sector assignment
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Subsystem includes S-100 interface, drive, cabinet, power supply, cables, software, and all documentation.

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CIRCLE 53

HARDWARE UPDATE

ment and education. Because of its increased mass-storage capacity, the new Apple III is also suited for OEMs and system integrators who need larger data-storage capacity.

Software solutions

The usefulness of the system is expanded by seven new enhanced application programs. One program, Access III, allows Apple III computers to communicate with large mainframes, and for the first time, to be used as remote data-processing work stations, accessing information from the larger data base and returning completed work to the central computer.

Other new or enhanced programs include Apple Writer III for word processing, VisiCalc III and Business Graphics III for preparing and analyzing detailed business information, Business BASIC and Pascal III for developing advanced application programs, and Script III for formatting Pascal text into layout-perfect printouts. In addition, an updated version of Mail List Manager will soon be available for maintaining mailing lists and printing labels using an Apple III/ProFile system.

Expansion

Apple III can be expanded to up to 256 kbytes of internal memory using the latest 64 kbyte random-access memory (RAM) technology. This provides more information storage with lower power consumption, resulting in enhanced reliability. The additional memory also enables users to run larger, more sophisticated programs than previously possible.

The memory enhancement is also available as an upgrade kit to present owners of Apple IIIs with 128 kbytes of RAM memory. It will be offered as a system option early this year.

Each Apple III comes with a set of system-software diskettes which contain the Sophisticated Operating

System (SOS 1.1), the utilities file and device-maintenance formatting software and the emulation-mode software.

The software supports up to 256 kbytes of internal memory and uses no additional I/O slots, leaving four slots free for peripheral devices. It has a Disk Switch Detect feature that protects against writing data on an incorrect disk. This feature supports the RS-232-C protocol, a communication standard that allows immediate use of most serial printers via a built-in interface, and communicates with other devices using modems. The software also provides an enhanced emulation mode that allows almost all Apple II software to run on Apple III.

The ProFile Personal Mass-Storage System expands the usefulness of the Apple III in applications requiring large amounts of stored data, and accesses data faster than conventional floppy disk drives. ProFile is a complete, self-contained unit featuring an intelligent controller, a 5½-inch Winchester drive, a power supply and an interface card.

Apple III owners can upgrade to the new version at no charge even if the warranty has expired. Registered owners of Apple IIIs will receive mailed notification of the upgrade process directly from Apple.

The new Apple III with 128 kbytes of memory and SOS software is priced at \$3495. The complete system with Business BASIC, VisiCalc, SOS and Monitor III is \$4190.

The minimum Apple III configuration needed to operate the ProFile mass-storage system includes 128 kbytes of RAM, the new SOS 1.1 operating system and utilities. The price of the Apple III/ProFile system is \$6994.

For more information: Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014; (408) 996-1010. **CIRCLE 151**

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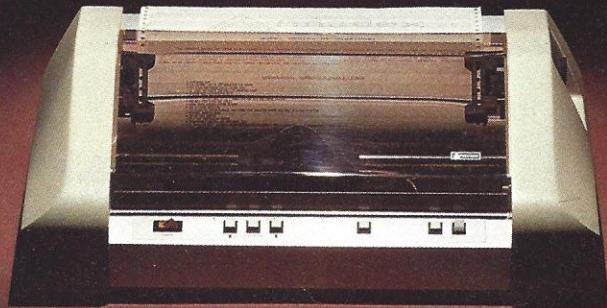
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Standard in all models are the three ASCII compatible interfaces (Parallel, RS-232-C, and Current Loop). Also standard is a sophisticated communications interface to control Vertical Spacing, Form Length and Width, Skip-Over Perforation, Auto Line Feed, X-On/Off, and full point-to-point communications.

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Beyond the built-in performance of the grafixPLUS series printers, the engineered-in quality and support are equally important. The result? Approval of both UL and FCC, Class A; operating noise levels under 65dBa; and a nationwide service organization second to none.

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HARDWARE

SYSTEMS

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The system has 64k of local memory, 716k of minidiskette storage, a 12-inch green-phosphor video screen, an 83-key keyboard and two 5½-inch floppy disk drives. For communications, the system also has two RS-232-C programmable synchronous/asynchronous ports.

Applications include engineering and scientific computations, laboratory automation, medical diagnostics, data acquisition and process control, numerical control and remote data-entry.

The price is \$5350.

For more information: Data General, Rt. 9, Westboro, MA 01581; (617) 366-8911. **CIRCLE 152**

Technical Systems

Two technical computer systems are available for industrial and scientific applications. The computers can be used for automating laboratory experiments, procedures and data processing.

One of the systems is the 3100, which includes a Vector 3 Z80-based processor and terminal, and two 5½-inch double-sided floppy disk drives

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CIRCLE 55

January 1982/Personal Computing

123

Solve the Great Software Mystery!

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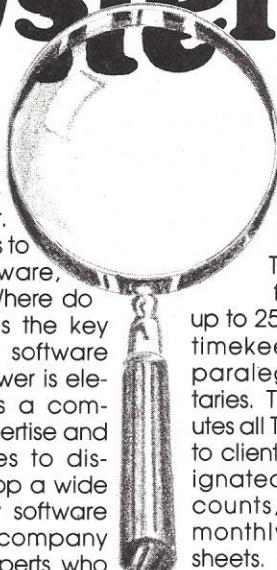
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Complex transactions recording is reduced to a minimum because the LBS system is based on daily timesheets prepared by each timekeeper with a complete system for coding client matters and expenses. The attorney auditing the pre-billing review form can choose various predetermined rates, or bill on retainer, contingency fee or an adjusted basis.

The Office Management Summary provides a financial analysis of each attorney's billings, aging of his accounts receivable and an analysis of the work effort of each timekeeper and total

for the firm. The Accounts List summarizes current activity and status of each client.

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The system reduces time required to complete a return while also minimizing the tax obligation of the taxpayer within the limit of the law. Three levels of tax preparation systems are available:

Level 1 — Uses 23 schedules and forms, handles multiple clients, and prints IRS approved forms.

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Level 3 — All of Level 1 plus partnership schedules and forms.

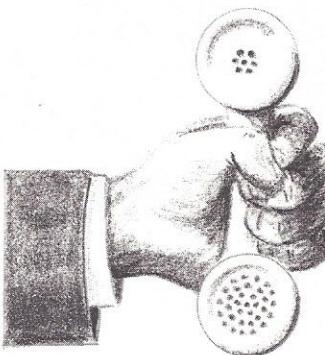
State tax computation for the following states is available at additional cost: Arizona, California, Illinois, Ohio, Oregon, Maryland, New York,

Utah, Virginia and Washington, D.C.

Other states and municipalities are being added.

Prices:

Level 1 — \$250
Level 2 — \$1,000
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hanced pica. All fonts feature fixed- or proportional-spacing format options at six or eight lines per inch plus 1/144-inch incremental line feed.

The price is \$795.

For more information: NEC Home Electronics, Personal Computer Div., 1401 Estes Ave., Elk Grove Village, IL 60007; (312) 228-5900.

CIRCLE 154

Application Package

The AP PAK is an application package consisting of hardware and software products. The package contains an AUTO PLOT printer-control card, an interface cable, software programs and instruction manuals for the Apple II.

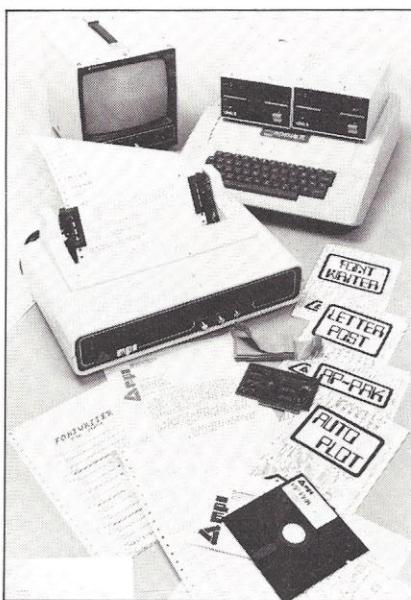
The AUTO PLOT card plugs into the Apple II peripheral slots and

drives a graphics printer through a parallel I/O cable supplied with the package. The card can transmit a

graphic picture from any Apple high-resolution display to the printer with a single keystroke. If suitable control parameters are supplied, it can print the display in any of three heights or 12 widths, indented, rotated 90 degrees or it can print separate graphic files side by side.

FONT WRITER is one of the software programs provided with the AP PAK. The user can select a printout in three different graphic fonts in three heights and six widths.

LETTER POST is another software program provided with the package. It facilitates the computer generation of individually printed letters to specified names from a mailing list. Prewritten paragraphs can be chained to make a letter and can be printed out in any font or type style available with **FONT WRITER**.



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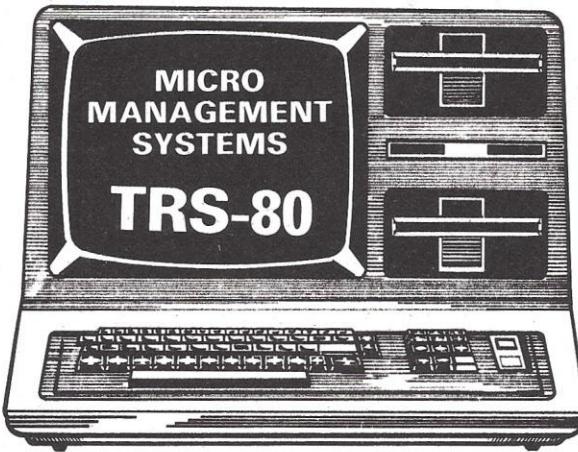
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CIRCLE 58



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tested into a product; it must be built in from the beginning by people who know what they are doing.

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We formed Designer Software because we believed that the quality hardware of today demanded software of equal quality. It took a lot of time, sweat, money, care, experience and talent to make that belief a reality.

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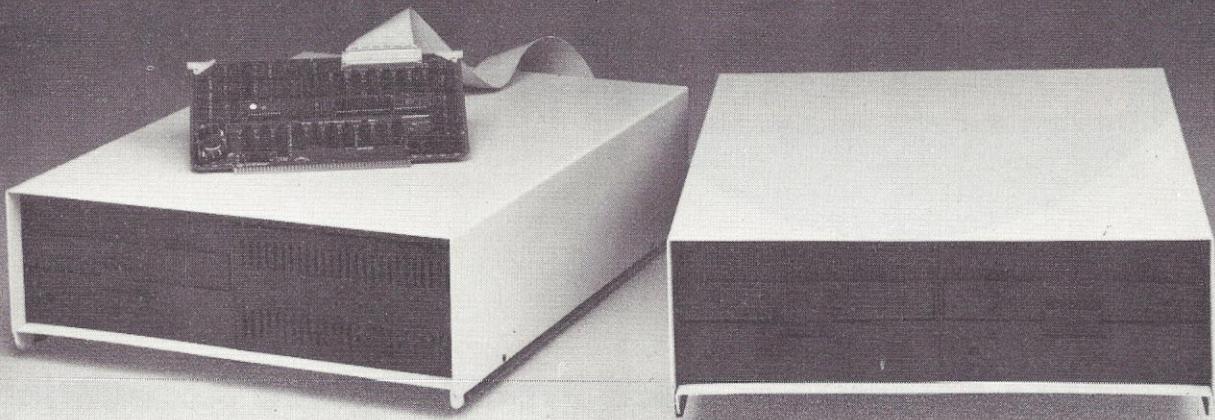
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HARDWARE UPDATE

Graphic pictures can also be inserted in the text.

The price of the package is \$145.

For more information: MPI, 4426 S. Century Dr., Salt Lake City, UT 84107; (801) 263-3081. **CIRCLE 155**

Printer Driver

An RS-232 Printer Driver is available for the TRS-80 Model I, Level II with 16k. It is equipped with an RS-232-C board, is coded in assembly language and interfaces with the LLIST and LPRINT commands.

The driver has 16 user-selectable options that allow it to interface to almost any type of serial printer. Options include form length, pagination, carriage width, null after C/R insertion, hardware handshake and X-ON/X-OFF recognition.

The price is \$35 including a cassette and manual.

For more information: Micro Systems Software, 3235 Kifer Rd., Suite 32, Santa Clara, CA 95051; (408) 735-1650.

CIRCLE 156

screen. It also offers a 45.5 baud Baudot-coded Weitbracht modem for deaf and hearing-impaired users.

The modem can operate at 50 or 75 baud for very low-speed communication; 110 or 150 baud which is normally used for teletypewriters; and 300, 600 or 1200 baud for use on standard dial-up telephone lines.

The price is \$389.

For more information: Novation, 18664 Oxnard St., Tarzana, CA 91356; (213) 996-5060. **CIRCLE 157**

COMMUNICATION

Integrated Modem

The Apple-Cat II is a large-scale integrated modem for the Apple II and II Plus. It has eight selectable transmission rates up to 1200 baud on a single printed-circuit board.

Features of the modem include software on a floppy diskette and a selectable menu of 19 functions displayed on the CRT screen. Each function can be activated by pressing a single key on the keyboard. Programming knowledge is not required as all operations are identified on the

A new communications multiplexer allows the TRS-80 Model II to respond to information requests from as many as 16 telephone lines at once.

When used with a TRS-80 Videotex terminal or Radio Shack Videotex software, the multiplexer makes private-information networks possi-



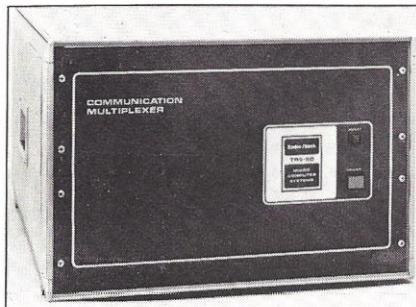
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HARDWARE UPDATE

ble for such special-interest user groups as farmers, publishers, newspapers, professional organizations and large individual corporations.



In an operating Videotex system, a calling terminal first sees a listing (or menu) of the categories of information which can be retrieved from the memory of the Model II host computer. Once the caller has specified a selection, the information is transferred from the Model II, over the

telephone line, and appears on the caller's terminal TV screen.

The multiplexer is available in two versions: with an eight-line capability for \$6000, or with a 16-line capability for \$8000.

For more information: Radio Shack, 1600 One Tandy Center, Fort Worth, TX 76102; (817) 390-3272.

CIRCLE 158

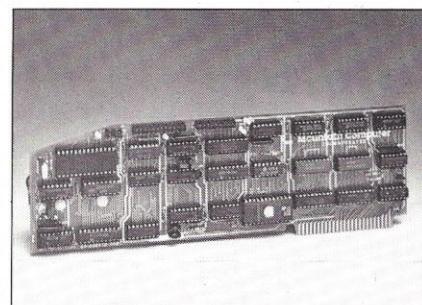
BOARDS

All-In-One Card

The CPS MultiFunction Card provides the capabilities of a serial interface, a parallel-output interface and a real-time calendar/clock. It occupies only one slot on the Apple II.

CPS is configured from a setup program on diskette which sets the

parameters for all functions contained on the card. Parameters are stored in CMOS RAM on the card and may be changed from the keyboard with control commands.



All function setups stored on-board are battery powered. The price is \$239.

For more information: Mountain Computer, 300 El Pueblo Rd., Scotts Valley, CA 95066; (408) 438-6650.

CIRCLE 159

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CIRCLE 57

SOFTWARE UPDATE

BUSINESS

Material Data Base

Bill of Materials has been added to the GOLD (General On-Line Database) software line. The program is designed to provide a multilevel parts explosion with unlimited levels for manufacturers.

Functions of the program include enter, lookup or change bill-of-materials, print bill-of-materials explosion and record production.

The program's summary report provides a "material requirements planning report" and gives information on quantity. This information includes required, on hand, on order, reserved and net-quantity required.

Bill of Materials is written in

CBASIC2, runs on most CP/M systems with hard or floppy disks and comes with source code. The price is approximately \$1500 including the GOLD inventory package.

For more information: Douthett Enterprises, 906 N. Main, Wichita, KS 67203; (316) 262-1040.

CIRCLE 160

Accounting System

Real-Tabs, written in North Star BASIC, is a computerized accounting package. It is available for real estate and management brokers, attorneys, title companies, mortgage brokers and other businesses.

The programs operate in a real-time mode making it possible to obtain various to-date reports (printed or viewed) at the end of each business day. Payroll is supported along with

summary reports of year-to-date or any specified time period. A database management system is also included, providing managerial control. Ordered files provide instant retrieval of the business history and identity of any client or customer.

The system is available for any North Star disk system or the North Star Horizon personal computer. The price is \$400. A demonstration disk and manual cost \$45; the manual alone costs \$15.

For more information: Vincent D. Puzar, 5905 Gulf Blvd., St. Pete Beach, FL 33706; (813) 360-7577.

CIRCLE 161

Financial Modeling

PLAN80 is a modeling system for personal computers. It interactively produces bar charts and line graphs

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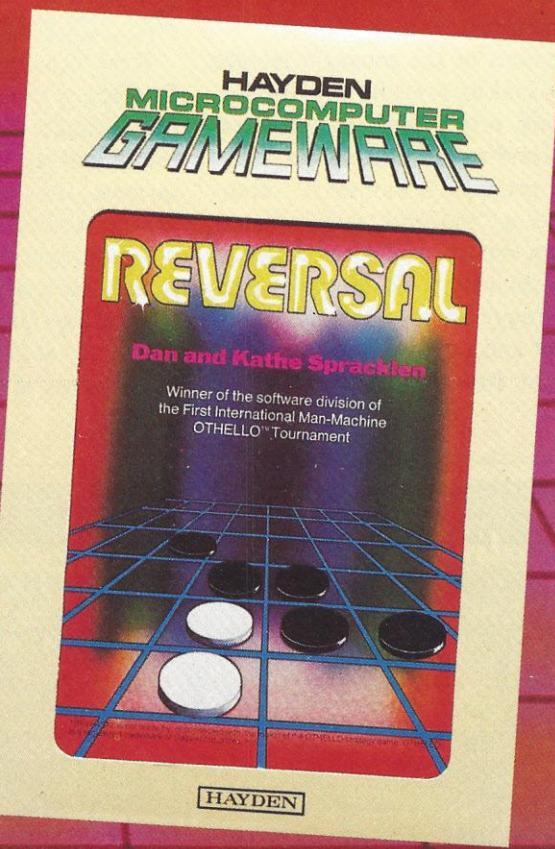
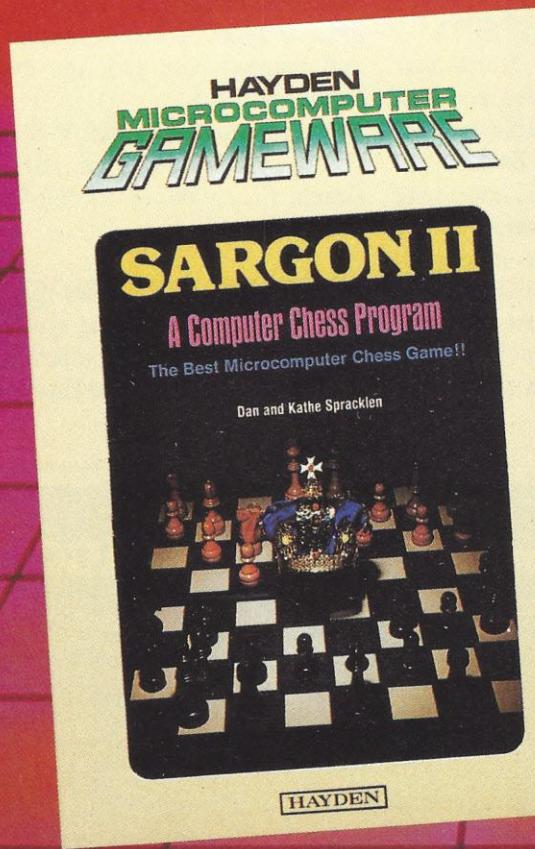
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SOFTWARE UPDATE

on almost any CRT terminal to help users visualize planning results.

Users enter row and column definitions, data assumptions and calculation statements. Results are calculated and users have complete control over the format of reports. At any point assumptions may be changed interactively, and results may be recalculated and displayed or printed.

PLAN80 is available for Apple, CP/M and UCSD systems. The price is \$295.

For more information: Business Planning Systems, 2 North State St., Dover, DE 19901; (302) 674-5500.

CIRCLE 162

Word Processing

A color word-processing system with a self-teach program and a 12,000-word dictionary is now available.

The self-paced computerized "teach" program within the system assists those unfamiliar with computers and word processors. Another feature of the system is its ability to search and replace a word no matter how many times it appears in a document. Inserting and erasing is accomplished all in a single step. Also featured is a character-sensitive erase mode.

The system includes automatic page numbering; draft printing without leaving the document; and block move, copy, delete, write, print and justification capability. Easy integration of mail lists, an automatic disk-overflow routine, a diskette-supply indicator and single-key commands are also included.

The system is completely menu-driven so users always receive step-by-step instructions to reduce the possibility of error. A separate six-volume "Creative Programming" series is offered as an option for the first-time user wishing to learn more about other computer operations.

The price of the system is \$495. The first volume in the series is

\$12.95, and all other volumes are \$9.95 each.

For more information: NEC Home Electronics, Personal Computer Div., 1401 Estes Ave., Elk Grove Village, IL 60007; (312) 228-5900.

CIRCLE 163

EDUCATIONAL

Authoring System

The Blocks II Author Language System is a computer-assisted instruction program designed for edu-

The powerful package:

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Allows you to learn the basics of text editing quickly. Advanced features will meet your expanding word processing requirements far into the future. \$150.00

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CIRCLE 38

SOFTWARE UPDATE

cators who have little or no programming experience. The authoring system has been developed to help fill the gap between available and desired educational programs.

The system consists of several programs. A teacher-authoring program, used only when writing a lesson, allows the teacher to make use of the graphics library and combine graphic images with text for presentation to the student. The teacher also inputs the correct and incorrect answers and feedback appropriate to each response.

A student-presentation program presents the lesson to the student and allows him to interact with the previously authored program. It asks questions and gives feedback for each response.

The graphics-development program develops graphic images for the

graphics library. It enables the author to create new images, use portions of old images or combine images. It can fill an irregular shape with color and gives the author many colors and patterns from which to choose.

The graphics-library program is used when authoring a program. The teacher requests images from the graphics library and puts them into the lesson that is being written.

To keep track of student progress, the data-management program enables the teacher to set up a sequence of lessons that match the individual needs of each student.

Blocks II is available for use on a 3.3 DOS Apple. In student mode, the system requires an Apple II with a single disk drive.

The price is \$500.

For more information: San Juan

Unified School District, 3738 Walnut Ave., Carmichael, CA 95608; (916) 484-2011.

CIRCLE 164

Learning Lab

The TRS-80 Color Computer Learning Lab is a self-instruction system that teaches users how to program in Color BASIC.

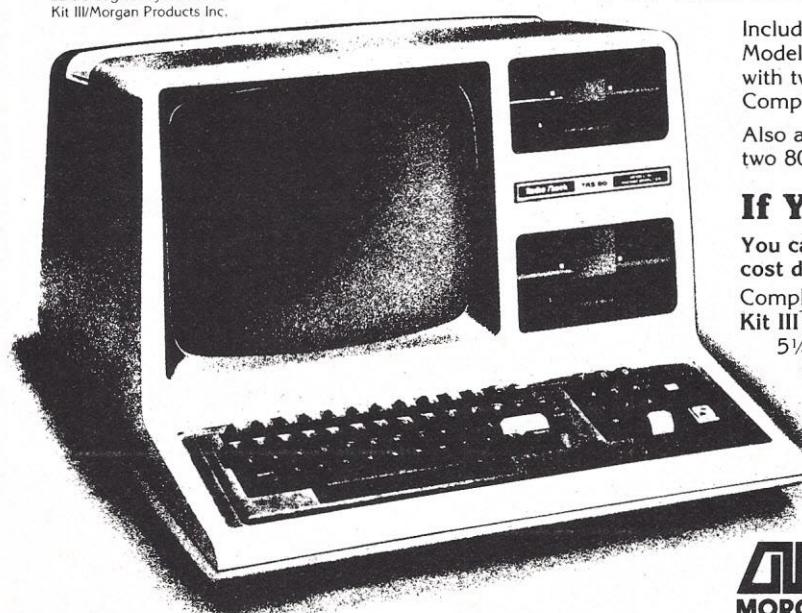
The lab is divided into three sections. The first section includes an introduction to the computer, shows how to enter programs and tells how the computer uses special words to describe each step. Twelve self-grading lessons are included.

The second section shows how the computer can be programmed to create games, solve formulas, create and play music, create art and teach. The 10 lessons contain software examples and experiments.

The third section includes pro-

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CIRCLE 61

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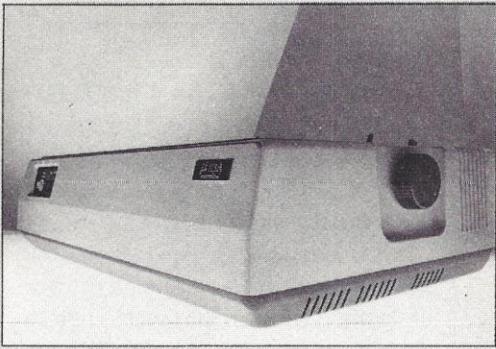


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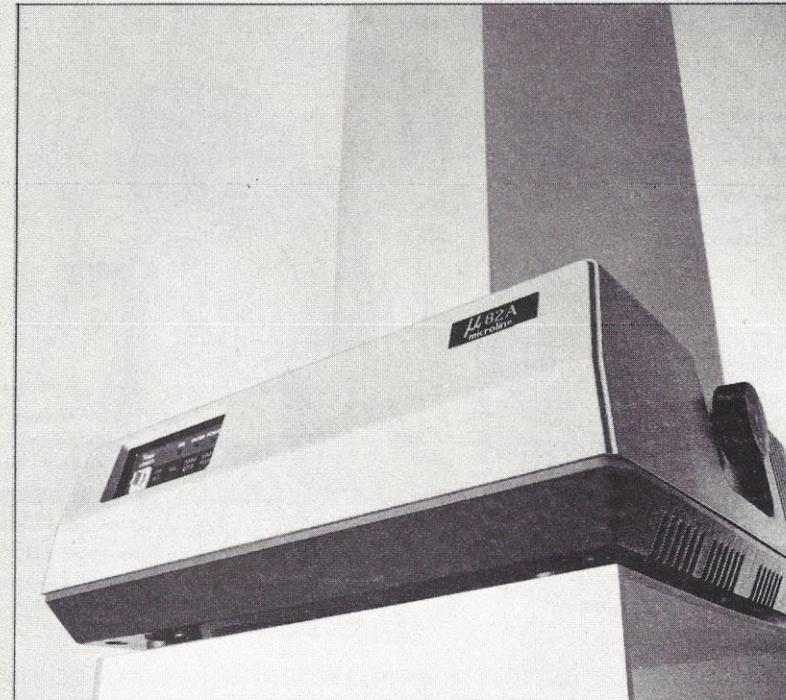
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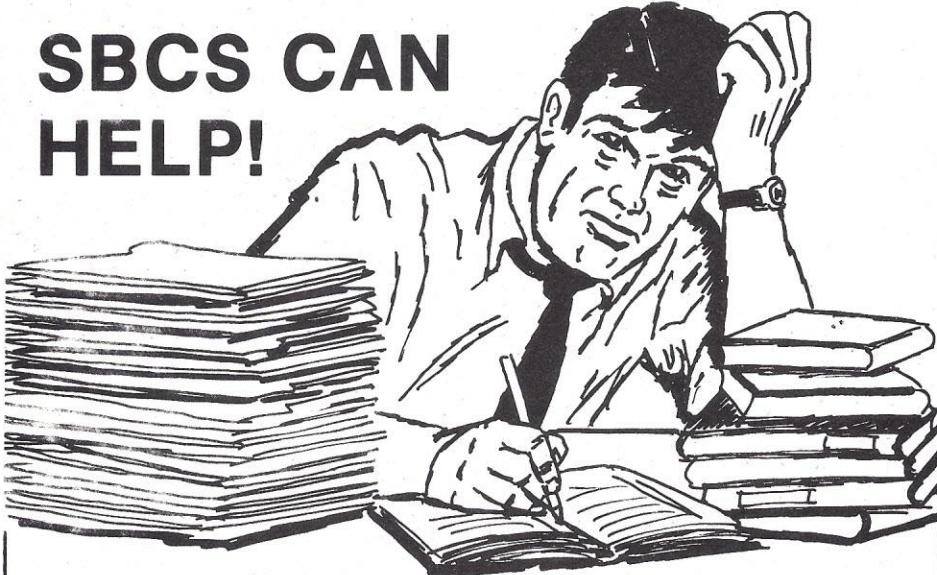


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CIRCLE 63

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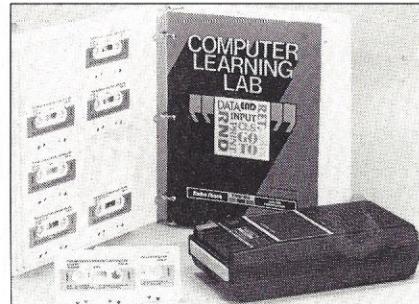
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CIRCLE 64

SOFTWARE

gramming guides and tools. Eight lessons illustrate these programming guidelines.



Included are eight program cassettes, for which a standard audio-cassette recorder is required, and a 30-lesson text. The price is \$49.95.

For more information: Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102; (817) 390-3300.

CIRCLE 165

UTILITY

Apple Editor

ADVANCED X-TENDED EDITOR (AXE), a programming aid, provides the user with a text-editor style extension to the standard Applesoft operating system.

AXE remains transparent to the user until called upon by one of over 30 commands. Features include global search/replace, character and statement insert/delete modes, auto line number, two packed editing modes, recall-editing modes, programmable-keyboard macros, four list formats and enhanced-cursor movement.

The price is \$69.95.

For more information: Versa Computing, 3541 Old Conejo Rd., Suite 104, Newbury Park, CA 91320; (805) 498-1956.

CIRCLE 168

Data-Base Processor

The Z65 is a data-base processor available for the Apple II. It consists of both hardware and software such as a Z80 cpu, a 6502-Z80 software interface and a Z80 implementation of MDBS.

SOFTWARE UPDATE

Since the software uses 20k, there is an increase in available memory for application programs. All application development is performed within Apple DOS using Applesoft BASIC. The program incorporates MDBs, so it supports both a host-language interface and a query interface that allows data retrieval with a single English-like statement.

The Z65 also offers control over data redundancy, automatic-data integrity and security enforcement, automatic-transaction logging and recovery and data-base restructuring.

The Z65 package with a Z80 cpu card is available for \$1600. Without the card the software is \$1500.

For more information: Micro Data Base Systems, P.O. Box 248, Lafayette, IN 47902; (317) 448-1616.

CIRCLE 169

Directory Formatter

Directory Master is a machine-language utility for the Apple II. It lets a user customize disk catalogs for a more professional look.

The program allows a user to create diskette headers and catalog titles containing normal, inverse, flashing and/or control characters. Any number of file names may be hidden so that they cannot be seen when the disk is cataloged.

In addition, the program allows a user to recover files that have been accidentally or intentionally deleted from a disk. Any range of files may be locked, unlocked or deleted with a few keystrokes. Files may also be "expunged" from the disk, wiping the disk clean as if they had never existed. All changes are written directly to the disk being modified, eliminating the need for INITing a new disk or creating POKE files.

Written in Applesoft, the program requires either an Apple II Plus, an Apple II with language card or Applesoft in ROM. It works with either one or two disk drives. Separate versions are available for DOS 3.2.1 and DOS 3.3.

The price is \$39.95.

For more information: Micro-SPARC Systems, P.O. Box 325, Dept. P, Lincoln, MA 01773; (617) 259-9710.

CIRCLE 170

LEISURE/HOME

Diet Program

COMPUCAL is a diet program for use on the TRS-80 Model I or III. The package consists of two pro-

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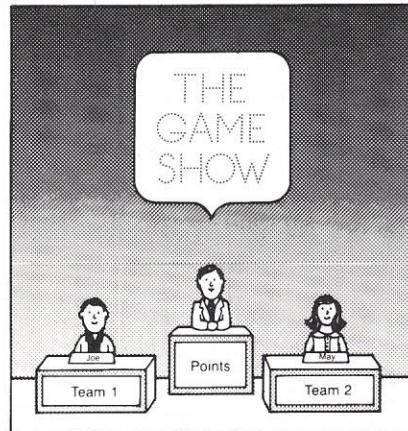
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CIRCLE 83

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CIRCLE 85

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CIRCLE 66

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Shack-80 Model-1 Users:

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SOFTWARE UPDATE

grams that let the computer count the calories.

The first program provides information on the basis of weight loss via the calorie-reduction method. It shows charts for men and women that help a prospective dieter find an ideal weight and daily calorie requirements. Based on the dieters weight, age, sex and desired final weight, it calculates a daily calorie intake to arrive at this weight in the specified time. It also warns if the weight-loss program is too fast, suggesting a longer period of time. A few typical menus are also furnished.

The second program can be run at the close of each day to help the dieter see how well he met the daily calorie goal. The computer prompts for the food and the quantity if more or less than the standard measure. It then adds up all calories and arrives at a calorie-consumption total for that day. Calorie values for most common foods are included. Additional foods can be added or the dieter can supply calories for non-included foods before the daily total is calculated.

Each program runs in 16k or can be combined to run in 32k as one large program.

The price is \$12 on cassette or \$17 on diskette.

For more information: Practical Programs, 1104 Aspen Dr., Toms River, NJ 08753; (201) 349-6070.

CIRCLE 171

Presidential Game

Meet the Presidents is an educational game presenting the 40 U.S. presidents. There are 39 full-color portraits, with high-resolution graphics for the Apple II.

The player is given clues and must type in the correct president's name. When this is accomplished, the portrait is fully revealed and computer music is played. Points are tallied for

the player's speed in identifying the presidents.

Other features include a slide show that will display portraits without the quiz game, and the ability to change the game clues. The programs require a 48k Apple with a DOS 3.3.

The price is \$39.95 for two double-sided disks.

For more information: Versa Computing, 3541 Old Conejo Rd., Suite 104, Newbury Park, CA 91320; (805) 498-1956.

CIRCLE 172

Galactic Game

Galactic Chase is a space attack and destroy game for one or two players. These players act as captains of a star ship that is the last defender of space.

Available on both disk and cassette for Atari computers with 16k, this game features several levels of skill and graphics capability.

The price is \$24.95 for cassette and \$29.95 for disk.

For more information: Spectrum Computers, 26618 Southfield Rd., Lathrup Village, MI 48076; (313) 559-5252.

CIRCLE 173

Sack Software

VIC SACKS are 10 software packages for the VIC 20 personal computer.

The programs include Cattle Roundup, Artillery, Head On, Snake Out, Chase, Adventure, Micro Maze, Target, Trapper and Hang In. All programs include color graphics and sound.

Each cassette costs \$9.95.

For more information: Computer-Mat, Box 1664, Dept. P, Lake Havasu City, AZ 86403; (602) 855-3357.

CIRCLE 174

CIRCLE 67

NEW LITERATURE

Pocket Dictionary

The International Microcomputer Dictionary is a pocket guide containing definitions of important terms, acronyms (with pronunciation) and numbers used by personal-computer users. In addition, the IMD provides a 10-language vocabulary of essential computer words.

The compact reference contains over 1600 definitions arranged alphabetically. In a separate section, over 200 computer terms are listed with their equivalents in Danish, Dutch, French, German, Hungarian, Italian, Norwegian, Polish, Spanish and Swedish.

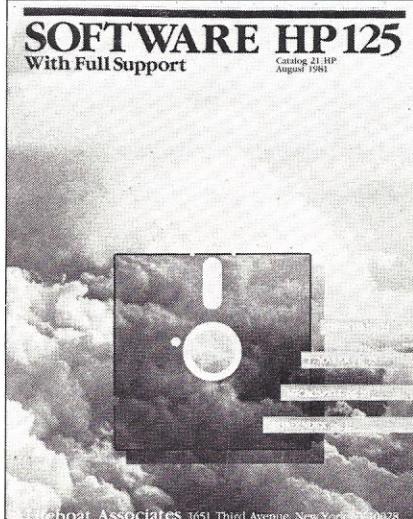
The price is \$3.95.

For more information: Sybex, 2344 Sixth St., Berkeley, CA 94710; (415) 848-8233.

CIRCLE 175

Software Catalog

Software With Full Support For The HP 125 describes nearly 100 programs for use in business, professional and personal applications, and



will be included with HP Business Analyst Computers.

The catalog includes software for financial accounting, data management, mailing list, word processing and telecommunications. It also con-

tains numerical problem-solving tools, system tools, languages, and books and accessories. Prices for the software range from \$100 to \$2500.

The catalog is free.

For more information: Lifeboat Associates, Dept. HP, 1651 Third Ave., New York, NY 10028; (212) 860-0300.

CIRCLE 176

Book for Youngsters

A Young Person's Guide To Computers starts with an abbreviated history of how the computer was developed. The book includes basic elements of a computer, simple explanations of how a computer works, how to talk with and tell a computer what to do, the purpose of flow charts and discussions of the uses of a computer.

The book is heavily illustrated with line drawings and photographs.

The price is \$7.95.

For more information: Scelbi Publications, 35 Old State Rd., Oxford, CT 06483.

CIRCLE 177

Programming for Profit

Playing the Stock & Bond Markets With Your Personal Computer explains the principles of investing and gives advice on setting individual investment goals, how to target profits, time returns, determine degrees of risk and make decisions.

The book also covers specific systems including Apple II, Apple II Plus, PET 2001, Heath H89, HP-85, Intertec Data Systems Superbrain, TRS-80 Model I and Model II and the TI-99/4.

The price is \$16.95 hardbound; \$9.95 paperback.

For more information: Tab Books, Blue Ridge Summit, PA 17214; (717) 794-2191.

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CIRCLE 70

BUSINESS COMPUTING

Mailing list

continued from page 89

more fields you use, the fewer total records you can store on one disk.

It has a very good "browse" function that allows you to step through records four ways. A search function is also included that locates a specific record based on a string of up to 10 characters—any 10 characters anywhere in each record.

Micro Business System's **Mail List** allows sorting on any of 10 fields, including business name, street, city, state, zip code and a six-letter alpha code. The package also allows you to select subsets to print from any of 100 user-defined categories. It easily merges form letters from the Magic Wand word processor.

Although its sorting function is very flexible, it is based on numbered sort fields which can be more com-

plex than other sorting methods. For example, numbers 1–6 represent the alpha-code field, 7–34 represent the business name field, etc.

In addition, the package has a fixed-format. This is an inexpensive addition for a CP/M-based TRS-80 Model II to go with Magic Wand.

Micro Computer Industries' **CREATE-A-BASE** is an easy to use, but complex mailing list program and includes a simple data-base manager. It requires a \$70 ROM chip to be inserted before you can use it. It is a powerful link to Word Pro word-processing software, and has a flexible report generator.

Step by step

CREATE-A-BASE is one of the programs that allows a two-field sort

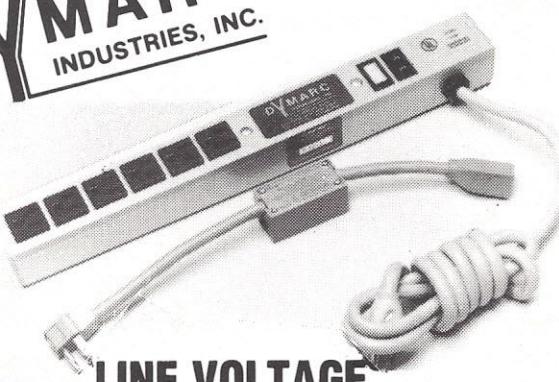
from any combination of 10 fields. Its manual is tutorial and is presented simply in step-by-step fashion.

Micro Industries has recently replaced the old search functions with a "Scan/Edit" function that adds a number of capabilities. You scan by matching a short character string, and the program will find and stop on each record that includes that character string. You can also access any file with one command or you can scan by record number.

Printing can be done by standard format which prints only a person's last name, or you can set up a special format to print any field you may want. You can also set the width of that field. You can select and print by either of two code lines.

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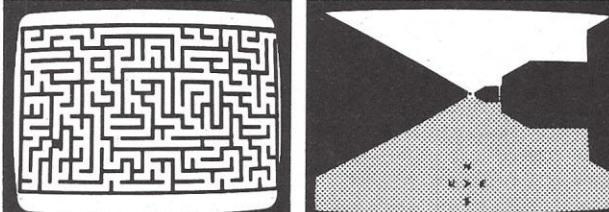
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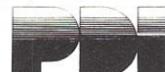
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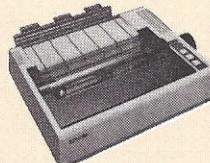
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BUSINESS COMPUTING

Manager comes with a large manual that combines the mail-list manual with introductory manuals to its Horizon computer.

The program itself has a combined format with three defined lines and six free lines, or a default format. Its capacity is directly related to the size of the eventual format as well as to disk density. It includes an easy character-based search, and a unique "hard-copy" echo that prints any entry or transaction that adds to, modifies or deletes a record.

Among its printing functions, the most unusual is its report generator. This prints all of the information, including special comment or code lines, or a sample or selection of specific records. You can also find out the status of the disk and an index of the formats.

Peachtree Software's **Mailing Address System** features automatic

sorting and posting, flexible record formatting, and external- and select-code functions. It also identifies duplicate files or files with the same names, so you can decide whether or not to delete them.

It searches only by name, and sorts by name, zip code and external code, a special code name or number for listing purposes. The select code lets you design and implement up to 12 one-character codes which you define in terms of your interests.

Program versatility

Prodigy Systems **Mailing List System** is versatile and flexible, with 1024 user-defined categories in an array. You can search and select with any combination of categories for extremely precise mailings.

It prints by alphabetical or zip-code order, so you must first pull out the specific categories and subsets

before you print. It also includes a sophisticated form-letter merging operation.

Radio Shack's **Mailing List II** is a program with a capacity of 3000 names, with compressed record sizes. It will merge up to eight fields from each record with letters and documents from Scripsit, a word processor and a second disk drive.

The package will print letters and envelopes with return addresses, a unique feature of this program. It automatically posts records on both alphabetical and zip-code order, and uses eight categories you define for searching, sorting and printing. It has a fixed format with only one comment line.

Software Sorcery offers **Mailing List**, an inexpensive program with an average per disk capacity. You can carry a file from one disk to the next for practically limitless capacity in

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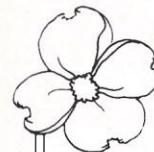


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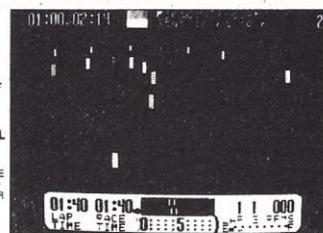
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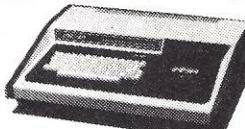
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BUSINESS COMPUTING

each file. Much of the program is written in machine language so it responds to commands, searches and sorts very quickly—as quickly as two seconds for 500 entries.

It prints envelopes as well as labels, and you can print by any range of letters or zip codes, or with a 15-character "wild card" code. Its format is fixed with seven fields, and it will merge and print form letters with the company's own form-letter program.

Instant access

Stonehenge Computer's **Commercial Mailer** is a hard disk-based program designed for a small-business that deals in thousands of mailings a week. Its manual reproduces screens of menus and procedures and explains each step carefully and clearly. It is one of the best packages for a company where clerical workers will

have to learn and use this program on their own.

Although the package is one of the best for small businesses, it does have drawbacks. There is no easy escape from a secondary menu or function to the main or primary menu. Another problem is a lack of information about what's on the disk. You must browse through entries first and then go back through the system to a specific record to make changes.

This browse function is useful if you don't know a surname or a zip code. Its default-entry feature is excellent. Although the feature is not essential, the program will also print each screen full of information as it appears on the monitor.

The program will merge files and has a "search for anything" that comes in handy.

Synergistic Software's **Mailing List/Data Base** uses very fast

machine-language routines for sorts, searches and record keeping. It has a limited file capacity of 215 names, but has a simple main menu and good sort and search functions. You can search for specified records in four ranges such as all current records, all files on disk, all files on a second disk and all files on both disks. It will search by a substring, one field and two fields, which is a very flexible combination.

The program will sort on up to three fields and list or print only those fields. The first sort is alphanumeric, while the other two are field-based, such as zip code and first name combined. It prints in six ways, including at a distinct starting point.

Synergistic's manual is short and in booklet form, but it is well-written, professionally laid out and includes all of the information you need to use the program.



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PROFESSIONAL COMPUTING

Market research

continued from page 48

many people would be needed to work in various service industries? For dozens of questions like these, Mastrobastista had to find answers extending all the way to 1990.

"I don't know how I could have done it without the computer," she says. The project was "expensive." Without the computer, it would have been prohibitively expensive because of the enormous amount of additional time that would have been involved, if it could have been done at all.

Filling 10 disks with information, she calculated and recalculated, running through every reasonable variation. The algebra was simple. Once she established the base year, she could give the computer a possible number of tourists for a given year, and the computer would alter the other areas affected by that change. By filling in one variable, she was able to quickly find the values for the other variables.

Projected over different growth levels, and accumulating the projections for 10 consecutive years, Mastrobastista was able to deliver to the client a detailed picture of what to expect in each area of the islands tourist economy at any given growth rate for a particular year.

At Laventhal & Horwath, Mastrobastista has picked up two years of experience on the personal computers, but has had no previous computer background. Neither was she an accounting and numbers person. Her training had been in hotel management. The Cayman Islands project has been so successful that the company is looking to apply her method to other hotel, travel, tourism and resort areas.

"The client was amazed," she states. What the research uncovered was that the Cayman Islands were somewhat over-prepared for tourism. The islands would have to increase the number of tourists faster than

they would have to develop other facilities, if tourism was to catch up with the condominium construction and other development that had been going on unplanned. Now the client has market research which can be used as a basis for future development plans. Without the personal computer, it might never have been done.

A personal nature

It is doubtful that the data-processing houses and large conventional market-research firms should fear any loss of business because of people turning to personal computers to provide market research. It will be a long time, if ever, before a personal computer has the power, speed and complex statistical capabilities to handle the masses of information usually required in traditional market research.

More importantly, the nature of personal computing is different from what is required for mass market research. What personal-computer user wants to take the time to input the results from hundreds or thousands of questionnaires, each containing dozens of questions? Who wants to do all the coding required for that kind of work?

The great advantage of the personal computer in market research, says Alan Sneider, the man who first brought an Apple computer into Laventhal & Horwath, is the ability to ask, "What if?" You can take the market-research data you have compiled from whatever source you can get it, use it to fill in VisiCalc's appropriate rows and columns, and you can then start massaging the figures, asking "what if," and probing for new insights.

That is creative market research, good business and exciting personal computing. You can't do that (very easily) with a mainframe.

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CIRCLE 87

PROGRAM LISTINGS

Astronomy

This program runs on an Apple II Plus.

continued from page 36

```

1  REM ****
2  REM * THE RELATIONSHIP
3  REM * OF STARS IN SPACE
4  REM * BY
5  REM * HAROLD W. MILLER
6  REM * 1124 N. PROSPECT
7  REM * SPRINGFIELD, MO. 65
8  REM ****
9  REM ***
10 HOME
11 VTAB 10: PRINT TAB( 15 );"STA
12 RS N.N."
13 VTAB 15: PRINT TAB( 12 );"HAR
14 OLD W. MILLER"
15 VTAB 18: PRINT TAB( 16 );"3/9
16 /81"
17 FOR N = 1 TO 2000
18 NEXT N
19 DIM AS(30): DIM BS(30): DIM C
20 $ (30): DIM ES(30)
21 FOR J = 1 TO 22: PRINT : NEXT
22 J
23 REM THE PROPER DESIGNATION
24 REM REFERS TO THE GREEK LET-
25 TER
26 REM AND THE THREE-LETTER
27 REM ABBREVIATION FOUND IN MA
28 NY
29 REM ALMANACS AND ASTRONOMY T
30 EXTS.
31 INPUT "DO YOU WISH TO SEE A S
32 PECIFIC CONSTELLATION? (USE
33 THE PROPER THREE LETTER DESI
34 GNATION) ";ES
35 PRINT : PRINT : PRINT : PRINT
36 : PRINT
37 IF ES = "" THEN 120
38 REM INPUT THE DECLINATION
39 REM AND RIGHT ASCENSION
40 REM IN DECIMAL DEGREES.
41 REM INPUT DISTANCE IN
42 REM LIGHT YEARS.
43 PRINT "GIVE ME THE NAME,RA(D
44 D),DEC(DD),DIST(LY). "
45 HGR
46 INPUT AS,GM1,PH1,R1
47 FOR M = 1 TO 159 STEP 5: HPLOT
48 139,M: NEXT M
49 FOR K = 1 TO 279 STEP 5: HPLOT
50 K,79: NEXT K
51 IF AS = "SUN" THEN GOTO 175
52 0
53 REM AFTER THE ANGLES ARE
54 REM CONVERTED TO RADIAN,
55 REM THE ANGLE AND DISTANCE
56 REM ARE USED AS THE VECTOR
57
58 REM REPRESENTATION OF THE
59 REM STAR'S POSITION.
60 GM1 = GM1 / 57.29578:PH1 = PH
61 1 / 57.29578
62 REM THE MATHEMATICAL
63 REM FORMULAE CAN BE FOUND
64 REM IN "THE VNR CONCISE
65 REM ENCYCLOPEDIA OF
66 REM MATHEMATICS", GALLERT
67 REM ET AL,VAN NOSTRAND
68 REM REINHOLT, NEW YORK,
69 REM 1977
70
71 190 X1 = R1 * COS (PH1) * COS (
72 GM1):Y1 = R1 * COS (PH1) *
73 SIN (GM1):Z1 = R1 * SIN (P
74 H1)
75 READ BS,GM2,PH2,R2
76 IF ES = "" THEN 240
77 IF BS = "9999" OR ES = "9999
78 " THEN GOTO 1820
79 IF ES < > RIGHTS (BS,3) THEN
80 GOTO 200
81 IF BS = AS THEN GOTO 200
82 IF BS = "9999" THEN GOTO 18
83 50
84 GM2 = GM2 / 57.29578:PH2 = PH
85 2 / 57.29578
86 X2 = R2 * COS (PH2) * COS (
87 GM2):Y2 = R2 * COS (PH2) *
88 SIN (GM2):Z2 = R2 * SIN (P
89 H2)
90 X3 = X2 - X1:Y3 = Y2 - Y1:Z3 =
91 Z2 - Z1:R3 = SQR (X3 ^ 2 +
92 Y3 ^ 2 + Z3 ^ 2)
93 PH3 = ATN (Z3 / ( SQR (X3 ^
94 2 + Y3 ^ 2))):PH3 = PH3 * 57
95 .29578
96 PH3 = INT (PH3 * 960 + .5) /
97 1000
98 IF X3 > 0 AND Y3 > 0 THEN GM
99 3 = ATN (Y3 / X3) * 57.2295
100 78
101 IF X3 < 0 THEN GM3 = (3.1415
102 96 + ATN (Y3 / X3)) * 57.29
103 578
104 IF X3 > 0 AND Y3 < 0 THEN GM
105 3 = (2 * 3.141596 + ATN (Y3
106 / X3)) * 57.29578
107 340 PRINT BS: PRINT " RA
108 DEC DIST": PRINT "
109 ;GM3;" ;PH3;" ;R3
110 341 REM THE LAST LINE LISTS
111 REM THE NAMES OF THE STARS
112 REM AS THEY ARE PLOTTED.
113 REM IT CAN BE DELETED IF
114 REM YOU WISH.
115 GM3 = (279 / 360) * (360 - GM
116 3):PH3 = (159 / 180) * ABS
117 (PH3 - 90)
118 IF GM3 < 0 THEN GM3 = ABS (GM3)
119 IF GM3 > 279 THEN GM3 = GM3 -
120 273
121 IF SQR (GM3 ^ 2 + PH3 ^ 2) <
122 1 THEN GOTO 200
123 HPLOT GM3,PH3: GOTO 200
124 REM DATA LIST PARTIALLY
125 REM FORMULATED BY AUTHOR,
126 REM PARTIALLY DRAWN UP
127 REM FROM THE 1981 EDITION
128 REM OF THE "WORLD ALMANAC
129 REM AND BOOK OF FACTS."
130 REM 'GE' REFERS TO GAL-
131 REM ACTIC EQUATOR. THESE
132 REM ARE POINTS NEAR THE EDG
133 REM E OF THE GALAXY.
134 DATA "GE1",265.654167,-23,1
135 14170
136 DATA "GE2",280.654167,2.5,1
137 13373
138 DATA "GE3",295.654167,28,11
139 1005
140 430 DATA "GE4",310.654167,44,10
141 7128
142 DATA "GE4",325.654167,54,10
143 1856
144 DATA "GE5",340.654167,58,95
145 349
146 DATA "GE7",355.654167,63,87
147 822
148 DATA "GE8",10.654167,63.5,7
149 9608
150 DATA "GE9",25.654167,62,710
151 94
152 DATA "GE10",40.654167,58,62
153 868
154 DATA "GE11",55.654167, 52.5
155 ,55740
156 DATA "GE12",70.654167,42,50
157 749
158 DATA "GE13",85.654167,23,48
159 930
160 DATA "GE14",100.654167,-2,5
161 0749
162 DATA "GE16",130.654167,-43,
163 62868
164 550
165 DATA "GE17",145.654167,-53,
166 71094
167 570 DATA "GE18",160.654167,-59,
168 79608
169 580 DATA "GE19",175.654167,-62,
170 87832
171 590 DATA "GE20",190.654167,-63.
172 5,95349
173 600 DATA "GE21",205.654167,-62,
174 101856
175 610 DATA "GE22",220.654167,-58,
176 107128
177 620 DATA "GE23",235.654167,-52,
178 111005
179 630 DATA "GE24",250.654167,-42,
180 113373
181 640 DATA "A AND",1.85,28.98333,
182 90
183 650 DATA "B CAS",2.025,59.033,4
184 5
185 660 DATA "A PHO",6.325,-42.4166
186 6.93
187 670 DATA "A CAS",9.85,56.43333,
188 150
189 680 DATA "B CET",10.65,-18.1,57
190 690 DATA "B AND",17.15,35.5166,
191 76
192 700 DATA "A ERI",24.25,-57.333,
193 118
194 710 DATA "G AND",30.675,42.2333
195 3,260
196 720 DATA "A ARE",31.5,23.3666,7
197 6
198 730 DATA "A UMI",32.95,89.167,6
199 80
200 740 DATA "O CET",34.575,-3.067,
201 103
202 750 DATA "B PER",46.725,40.883,
203 105
204 760 DATA "A PER",50.725,49.783,
205 570
206 770 DATA "A TAU",68.7,16.467,68
207 780 DATA "B ORI",78.4,-8.2167,9
208 00
209 790 DATA "A AUG",78.8,45.983,45

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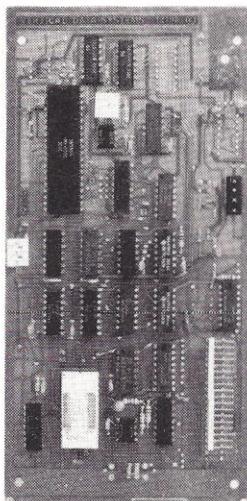
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```

800 DATA "G ORI",81.025,6.333,4
70
810 DATA "B TAU",81.25,28.6,300
820 DATA "D ORI",82.75,-.3167,1
500
830 DATA "E ORI",83.8,-1.2167,1
600
840 DATA "Z ORI",84.925,-1.95,1
600
850 DATA "K ORI",86.7,-9.683,21
00
860 DATA "A ORI",88.525,7.4,520
1030 DATA "B CAR",138.25,-69.63
3,86
870 DATA "B AUR",89.525,44.95,8
8
880 DATA "B CMA",95.45,-17.95,7
50
890 DATA "A CAR",95.875,-52.683
98
900 DATA "G GEM",99.15,16.4167,
105
910 DATA "A CMA",101.075,-16.68
3,8.7
920 DATA "E CMA",104.45,-28.57,
680
930 DATA "D CMA",106.95,-26.367
2100
940 DATA "N CMA",110.825,-29.26
7,2700
950 DATA "A GEM",113.325,31.93,
45
960 DATA "A CMI",114.575,5.283,
11.3
970 DATA "B GEM",116.025,28.083
,35
980 DATA "Z PUP",120.725,-39.95
,2400
990 DATA "G VEL",122.225,-47.28
3,520
1000 DATA "E CAR",125.75,-59.45
,340
1010 DATA "D VEL",131.05,-54.63
3,76
1020 DATA "L VEL",136.825,-43.3
5,750
1030 DATA "B CAR",138.25,-69.63
3,86
1040 DATA "I CAR",139.15,-59.18
3,750
1050 DATA "K VEL",140.375,-54.9
33,470
1060 DATA "A HYD",141.65,-8.567
,94
1070 DATA "A LEO",151.825,12.06
7,84
1080 DATA "G LEO",154.725,19.95
,90
1090 DATA "B UMA",165.15,56.483
,78
1100 DATA "A UMA",165.625,61.86
7,105
1110 DATA "B LEO",177.14.683,43
1120 DATA "G UMA",178.2,53.8,90
1130 DATA "A CRU",186.375,-62.9
83,370
1140 DATA "G CRU",187.5,-57,220
1150 DATA "G CEN",190.1,-48.85,
160
1160 DATA "B CRU",191.625,-59.5
83,490
1170 DATA "E UMA",193.3,56.067,
68
1180 DATA "Z UMA",200.775,55.03
3,88
1190 DATA "A VIR",204.65,-53.36
7,570
1200 DATA "E CEN",204.65,-53.36
7,570
1210 DATA "N UMA",206.7,49.4167
,210
1220 DATA "B CEN",210.6,-60.283
,490
1230 DATA "T CEN",211.375,-36.2
72,55
1240 DATA "A BOO",213.675,19.28
3,36
1250 DATA "N CEN",218.55,-42.06
7,390
1260 DATA "A CEN",219.55,-60.75
,4.3
1270 DATA "A LUP",220.15,-47.3,
430
1280 DATA "E BOO",221.025,27.15
,103
1290 DATA "B UMI",222.7,74.233,
105
1300 DATA "A CBO",233.45,26.383
,76
1310 DATA "D SCO",239.775,-22.5
67,590

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1320 DATA "A SCO",247.05,-26.38
3,520
1330 DATA "A TRA",251.625,-69.8
2
1340 DATA "E SCO",252.225,-34.2
5,66
1350 DATA "N OPH",257.3,-15.7,6
9
1360 DATA "L SCO",263.05,-37.08
3,310
1370 DATA "A OPH",263.5,12.567,
58
1380 DATA "T SCO",263.975,-42.9
83,650
1390 DATA "K SCO",265.275,-39.0
167,470
1400 DATA "D DRA",269.025,51.48
3,108
1410 DATA "E SAG",275.7,67,124
1420 DATA "A LYR",279.15,38.767
,26.5
1430 DATA "S SAG",285.5,-26.318
7,300
1440 DATA "A AQU",297.45,8.8167
16.5
1450 DATA "G CYG",305.375,40.2,
750
1460 DATA "A PAV",306.025,-56.8
,310
1470 DATA "A CYG",310.175,45.2,
1600
1480 DATA "E CYG",311.35,33.9,7
4
1490 DATA "A CEP",319.525,62.5,
.95,31000
      52
1500 DATA "E PEG",325.8,9.783,7
80
1510 DATA "A GRU",331.75,-47.06
7,64
1520 DATA "B GRU",340.375,-46.9
83,280
1530 DATA "A PAU",344.125,-29.7
33,22.6
1540 DATA "A PEG",345.7,27.967,
210
1550 DATA "B PEG",345.95,15.1,1
09
1560 DATA "LMC1",75,-70,160000
1570 DATA "LMC2",82.5,-72,16000
0
1580 DATA "LMC3",90,-70,160000
1590 DATA "LMC4",90,-67.5,16000
0
1600 DATA "LMC5",82.5,-67.5,160
000
1610 DATA "LMC6",75,-67.5,16000
0
1620 DATA "O UMA",182,57.75,85
1630 DATA "SMC 1",15,-72,200000
1640 DATA "SMC 2",22.5,-74,2000
00
1650 DATA "SMC 3",15,-76,200000
1660 DATA "SMC 4",7.5,-74,2000
0
1670 DATA "GAL CEN",265.654,-28
.95,31000
      1680 DATA "2 GAL CEN",265.654,-
29.95,31000
1690 DATA "3 GAL CEN",265.654,-
27.95,31000
1700 DATA "AND 1",7.5,40,220000
0
1710 DATA "AND 2",9,40,2200000
1720 DATA "AND 3",7,40,2200000
1730 DATA "SUN",0,0,0
1740 DATA "9999",0,0,0
1750 READ B$,GM2,PH2,R2
1760 GM2 = (279 / 360) * (360 - G
M2):PH2 = (159 / 180) * ABS
(PH2 - 90)
1770 HPLOT GM2,PH2
1780 IF B$ = "SUN" THEN GOTO 18
00
1790 GOTO 1750
1800 PRINT : PRINT " STAR MA
P AS SEEN FROM EARTH"
1810 END
1820 IF ES = "ORI" THEN ES = "OR
ION": IF ES = "UMA" THEN ES =
"URSA MAJOR": IF ES = "PER" THEN
ES = "PERSUS": IF ES = "TAU
" THEN ES = "TAURUS"
1830 IF ES = "AND" THEN ES = "AN
DROMEDA": IF ES = "VEL" THEN
ES = "VELA": IF ES = "CRU" THEN
ES = "CRUSUS": IF ES = "BOO"
THEN ES = "BOOTIS"
1840 IF ES = "UMI" THEN ES = "UR
SA MINOR": IF ES = "CYG" THEN
ES = "CYGNUS": IF ES = "SCO"

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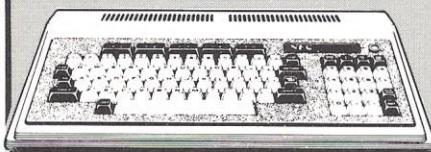
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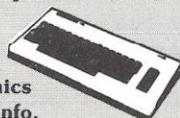
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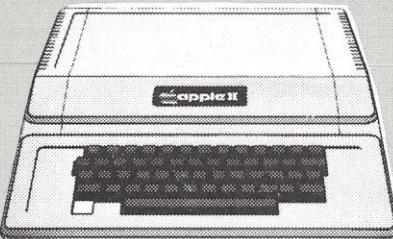
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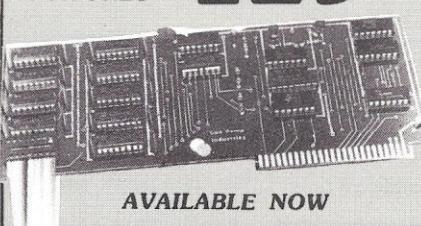
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```

THEN ES = "SCORPIO": IF ES =.
"PEG" THEN ES = "PEGISUS"
1850 PRINT : PRINT TAB( 9);ES;".
AS SEEN FROM ";A$: END
1860 REM AS YOU CAN SEE, MORE STARS AND THEIR COORDINATES CAN BE ADDED.
1870 REM TO DO THIS, ALL ONE HAS TO DO IS PUT THE NAME, THA

```

```

T IS THE THREE LETTER DESIGNATOR, IN THE FORM OF A STRING.
1880 REM THE STARS COORDINATE, THE DECLINATION AND RIGHT ASCENSION, IN DECIMAL DEGREES.
1890 REM THE STARS DISTANCE IN LIGHT YEARS.

```

```

2000 REM OBJECTS OTHER THAN STARS CAN BE USED SUCH AS GALAXIES, PULSARS, AND QUASARS.
2010 REM THESE LAST TWO OBJECTS, BEING BILLIONS OF LIGHT YEARS DISTANT, WOULD SERVE AS REFERENCE POINTS THAT WOULD NOT APPEAR TO CHANGE EXCEPT AT EXTREME DISTANCES.

```

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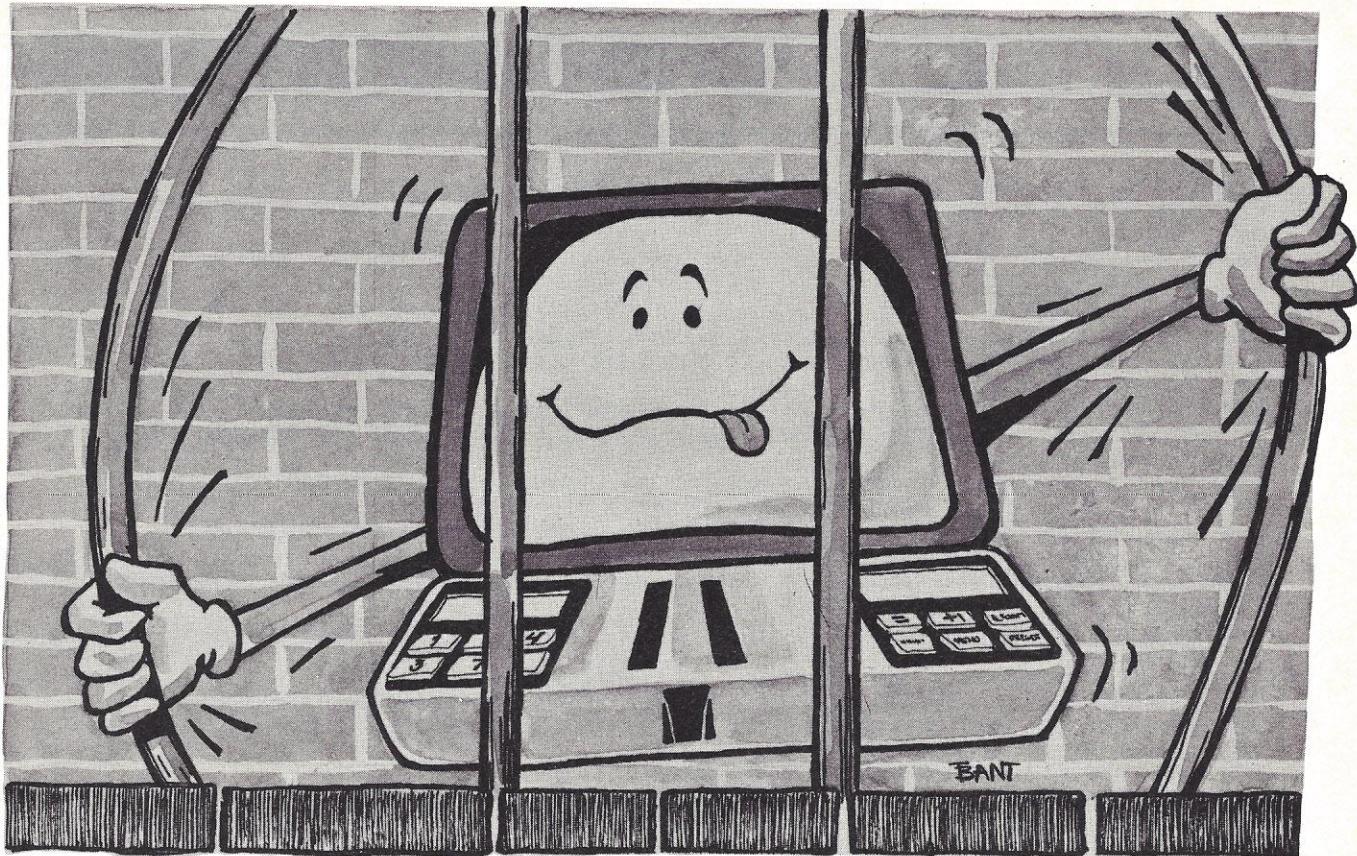
This program runs on a TRS-80 Model I.

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```

10 REM CAR T 6/80
20 CLEAR 20:DIM H(25,5):DEFINT F,I,N,T,X,Y,Z
30 CLS:PRINTTAB(26);"CAR HISTORY"
40 PRINT:INPUT"What is the reading on the tape counter";T:T=T+5
50 PRINT"Advance it to";T:INPUT"Ready";R$
60 PRINT:INPUT"Push 'play' on tape player...Ready";R$:ON ERROR GOTO90
70 INPUT#-1,M9,D5,M1,M4,M5,M8,C5,I:IF M9=0 THEN 100
80 FOR N=1 TO I:INPUT#-1,H(N,0),H(N,1),H(N,2),H(N,3),H(N,4),H(N,5):NEXT N:GOTO10
90 PRINT:PRINT"TAPE PROBLEM":PRINT"TRY REWINDING THE TAPE TO EXACTLY";T:PRINT:INPUT"Ready";R$:GOTO60
100 ON ERROR GOTO830:PRINT:INPUT"Push 'stop' on tape player...Ready";R$:CLS:IF M9>0 THEN 210
110 PRINT:PRINT"TO INITIALIZE THE PROGRAM, I'LL NEED SOME INFORMATION -"
120 PRINT:PRINT"WHAT IS TODAY'S DATE - MMDDYY":INPUT"FOR EXAMPLE JULY 4 1985 WOULD BE 070485 - ";D
130 IF D>10000 AND D<123199 THEN H(1,4)=INT(D) ELSE 120
140 PRINT:INPUT"What is present mileage reading of car";M9:IF M9<1 THEN 140 ELSE M9=INT(M9):H(1,3)=M9
150 PRINT:PRINT"I need to know how often you plan to do oil changes -":INPUT"Desired miles between changes";M8
160 IF M8<1 THEN 150 ELSE M8=INT(M8)
170 INPUT"Desired time interval between oil changes in months";D:IF D<1 THEN 170 ELSE D5=INT(D)*10000
180 PRINT:PRINT"You plan to do oil changes every";M8;"miles or ";
190 PRINT"Every";INT(D);";months.":PRINT:INPUT"Correct - 'yes or no' (Y/N)";R$:IF R$="N" THEN 150 ELSE IF R$<>"Y" THEN 180
200 M1=M9:M4=M9:M5=M9:I=1:Z=1:GOTO690
210 PRINT:PRINT"Fill up with gas? Note - do not enter gas purchases unless"
220 PRINT"tank was filled. Make a note of gallons and cost and add to":PRINT"Next fill-up."
230 PRINT:INPUT"Fill up with gas (Y/N)";R$:IF R$="N" THEN 320 ELSE IF R$<>"Y" THE
240 N 230
240 X=1:PRINT:INPUT"Gallons or liters (G/L)";R$:IF R$="G" THEN 260 ELSE IF R$<>"L" THEN 240
250 INPUT"Number of liters";G:G=G/3.785:PRINT USING "##.##";G:PRINT" Gallons":G
260 INPUT"Number of gallons";G
270 IF G>1 AND G<25 THEN 290
280 PRINT:PRINT"Please confirm...";G;"Gallons";:INPUT R$:IF R$<>"Y" THEN 240
290 INPUT"Cost $";C:IF C<G*3 THEN 310
300 PRINT:PRINT"Is that correct?";G;"Gallons cost $";C:INPUT" (Y/N)";R$:IF R$<>"Y" THEN 240
310 C5=C5+C
320 PRINT:INPUT"Add oil (Y/N)";R$:IF R$="N" THEN 340 ELSE IF R$<>"Y" THEN 320
330 Y=1:INPUT"QTS";O:INPUT"COST $";C:C5=C5+C
340 IF X=1 OR Y=1 THEN 350 ELSE 420
350 PRINT:INPUT"Mileage when gas/oil added";M:GOSUB950:IF F=1 THEN 350 ELSE M=INT(M)
360 IF X<>1 THEN 400 ELSE M2=M-M4:H(I,0)=H(I,0)+G
370 PRINT USING "##.##";M2/G;:PRINT" Miles/Per/gallon last tank"
380 IF H(I,0)<>G THEN 390 ELSE M6=M5-M4:R=M6/M2:G2=G*R:H(I-1,0)=H(I-1,0)+G2:H(I,0)=G-G2
390 M3=M-M5:PRINT USING "##.##";M3/H(I,0);:PRINT" MPG since last oil change"

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PROGRAM LISTINGS

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400 IF Y<>1 THEN 420 ELSE H(I,1)=H(I,1)+0: M3=M-M5
410 PRINT:PRINT USING "#####.##";M3/H(I,1);:PRINT" MILES/PER/QUART SINCE LAST CH
8"
420 IF X=1 OR Y=1 THEN M1=M
430 IF X=1 THEN M4=M
440 IF Y=1 THEN X=1
450 PRINT:INPUT"CHANGE OIL (Y/N)";R$:IF R$<>"Y"THEN 620 ELSE X=1
460 INPUT"MILEAGE ";M:GOSUB950:IF F=1 THEN 460 ELSE M=INT(M)
470 INPUT"TOTAL COST $";C
480 INPUT"DATE MMDDYY ";D:D=INT(D):IF D>10000 AND D<123199 THEN 500
490 PRINT"INPUT DATE USING NUMBERS - MMDDYY, JUL 4 1985 WOULD BE 70485":GOTO480
500 M3=M-M5:C5=C5+C
510 PRINT:PRINT USING "##.##";(M4-M5)/H(I,0);:PRINT" MPG SINCE LAST OIL CHANGE"
520 IF H(I,1)>.5 THEN 530 ELSE PRINT"NO EXTRA OIL USED":GOTO540
530 PRINT USING "#####.##";M3/H(I,1);:PRINT" MPQ SINCE LAST OIL CHANGE."
540 H(I,2)=M3: I=I+1:H(I,3)=M:H(I,4)=D:M5=M
550 PRINT:PRINT"I AM SET UP FOR";M8;"MILES BETWEEN OIL CHANGES OR";INT(D5/
10000);"MONTHS"
560 INPUT" DO YOU WANT TO CHANGE THOSE (Y/N) ";R$:IF R$="N"THEN 590 ELSE IF R$<>
"Y"THEN 560
570 PRINT:INPUT"DESIRED MILES BETWEEN OIL CHANGES";M8:M8=INT(M8)
580 INPUT"DESIRED MONTHS BETWEEN OIL CHANGES";D9:D5=INT(D9*10000):GOTO550
590 PRINT:PRINT"NEXT OIL CHANGE DUE BEFORE ";M+M8;"MILES";:D9=D+D5
600 IF D9>130000 THEN D9=D9-119999
610 PRINT"OR BY ";:GOSUB860:PRINT:GOTO630
620 PRINT:PRINT"OIL CHANGE DUE BY";M5+M8;:D9=H(I,4)+D5:GOTO600
630 PRINT:INPUT"ANY OTHER EXPENSES (Y/N)";R$:IF R$="N" THEN 670 ELSE IF R$<>"Y" T
HEN 630
640 X=1:PRINT:INPUT"MILEAGE";M:GOSUB950:IF F=1 THEN 640 ELSE M=INT(M)
650 INPUT"COST $";C:C5=C5+C:IF M>M1 THEN M1=M
660 GOTO630
670 PRINT:H(I,5)=C5/(M1-M9):PRINT"COST/MILE =";:PRINT USING"#####.##";H(I,5)
680 PRINT:INPUT"READY TO CONTINUE";R$:IF X>>1 THEN 730
690 CLS:PRINT"REWIND TAPE TO ";T;:INPUT" ...READY";R$:GOSUB900
700 PRINT:INPUT"DO YOU WANT TO MAKE A 'BACKUP' COPY OF THE DATA (Y/N)";R$:IF R$=
"N"THEN720 ELSE IF R$<>"Y"THEN 700
710 PRINT:PRINT"MAKE A NOTE ON THE CASSETTE OF THE COUNTER READING -":INPUT"LIKE
'COPY AT 100'....READY";R$:GOSUB900
720 IF Z=1 THEN 820
730 ON ERROR GOTO840:CLS:INPUT"WANT TO SEE RECORDS (Y/N)";R$:IF R$<>"Y" THEN820
740 CLS:PRINTTAB(25);"CAR HISTORY":PRINT:GOSUB880
750 FOR N=1 TO I:PRINT USING "##";N;:PRINTTAB(6);:PRINTUSING"#####";H(N,3);:
PRINT TAB(18);:D9=H(N,4):GOSUB860
760 G9=0:G1=0:IF H(N,0)=0 THEN 780 ELSE G1=H(N,2)/H(N,0):IF N=I THEN 780
770 IF H(N+1,0)=0 THEN G9=1
780 PRINTTAB(31);:PRINTUSING"#####";H(N,2);:PRINTTAB(43);:PRINTUSING"##.##";G1;
:IF G9=0 THEN 790 ELSE PRINT" *";:G8=1
790 PRINTTAB(53);:PRINTUSING"#####.##";H(N,5):L=L+1:IF L<12 THEN 800 ELSE PRINT
:INPUT"CONTINUE";R$:L=0:PRINT:GOSUB880
800 NEXT N:PRINT:PRINT"(COST/MILE IS CUMULATIVE)":PRINT
810 IF G8=0 THEN 820 ELSE PRINT" * = TENTATIVE FIGURE":PRINT
820 PRINT:PRINT"SEE YOU NEXT TIME":END
830 PRINT:PRINT"SORRY, WE HAVE A PROBLEM. IF YOU HAVE ENTERED ANY INFORMATION,":
PRINT"IT HAS NOT BEEN SAVED.":END
840 PRINT:PRINT"SORRY, WE HAVE A PROBLEM. ANY DATA YOU ENTERED HAS BEEN SAVED"
850 PRINT"BUT I'M HAVING TROUBLE WITH A CALCULATION.":END
860 D1=INT(D9/10000):D2=INT((D9-D1*10000)/100):D3=INT(D9-(D1*10000+D2*100))
870 PRINT USING "##";D1;:PRINT"/";:PRINT USING "##";D2;:PRINT"/";:PRINT USING "#
";D3;:RETURN
880 PRINT"CYCLE";TAB(7);"SRT MILE";TAB(18);"SRT DATE";TAB(29);
890 PRINT"TOT MILES";TAB(44);"MPG";TAB(55);"COST/MILE":RETURN
900 PRINT:PRINT"PUSH 'RECORD' AND 'PLAY' ON TAPE RECORDER";
910 POKE15566,131:POKE15567,131:POKE 15568,131:INPUT"....READY";R$*
920 PRINT#-1,M9,D5,M1,M4,M5,M8,C5,I
930 FOR N=1 TO I:PRINT#-1,H(N,0),H(N,1),H(N,2),H(N,3),H(N,4),H(N,5):NEXT N
940 PRINT:INPUT"PUSH 'STOP'....READY";R$:RETURN
950 F=0:IF M>=M1 THEN RETURN
960 PRINT:PRINT"BUT THAT'S A LOWER READING THAN THE LAST ONE YOU ENTERED??":F=1:
RETURN

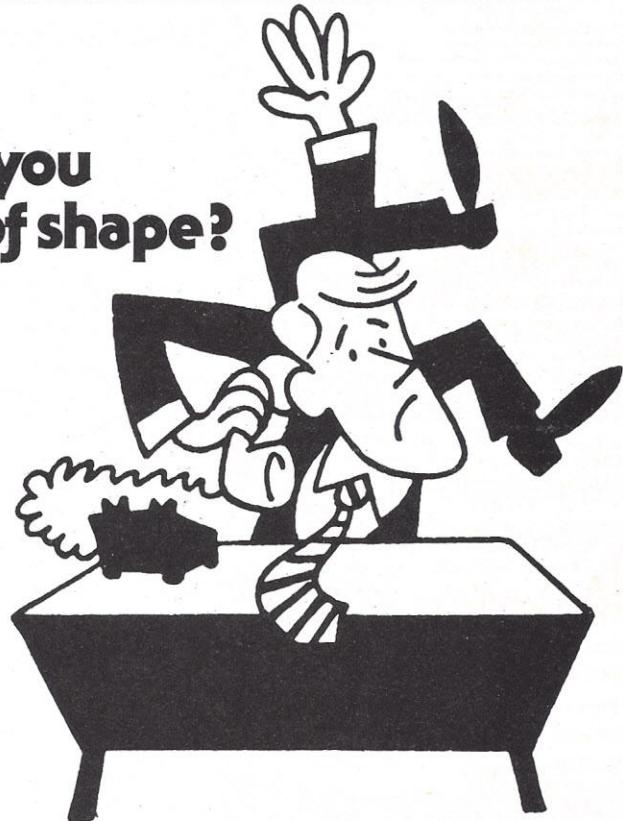
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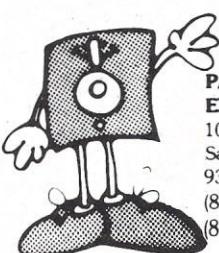
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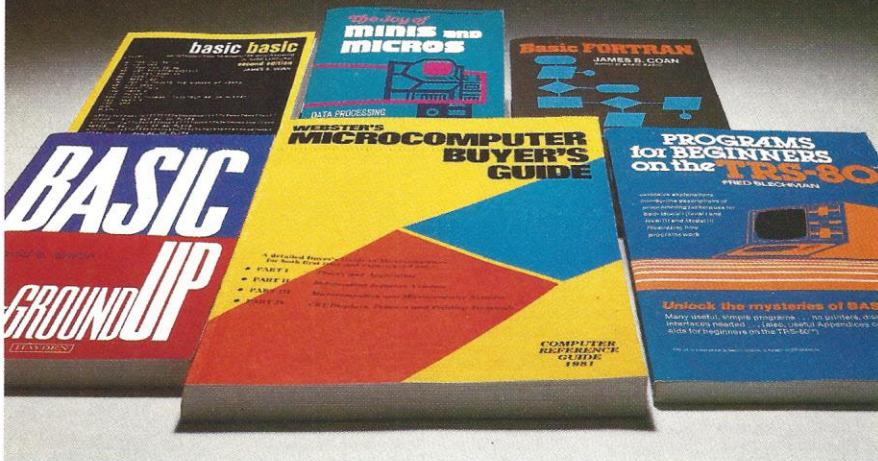


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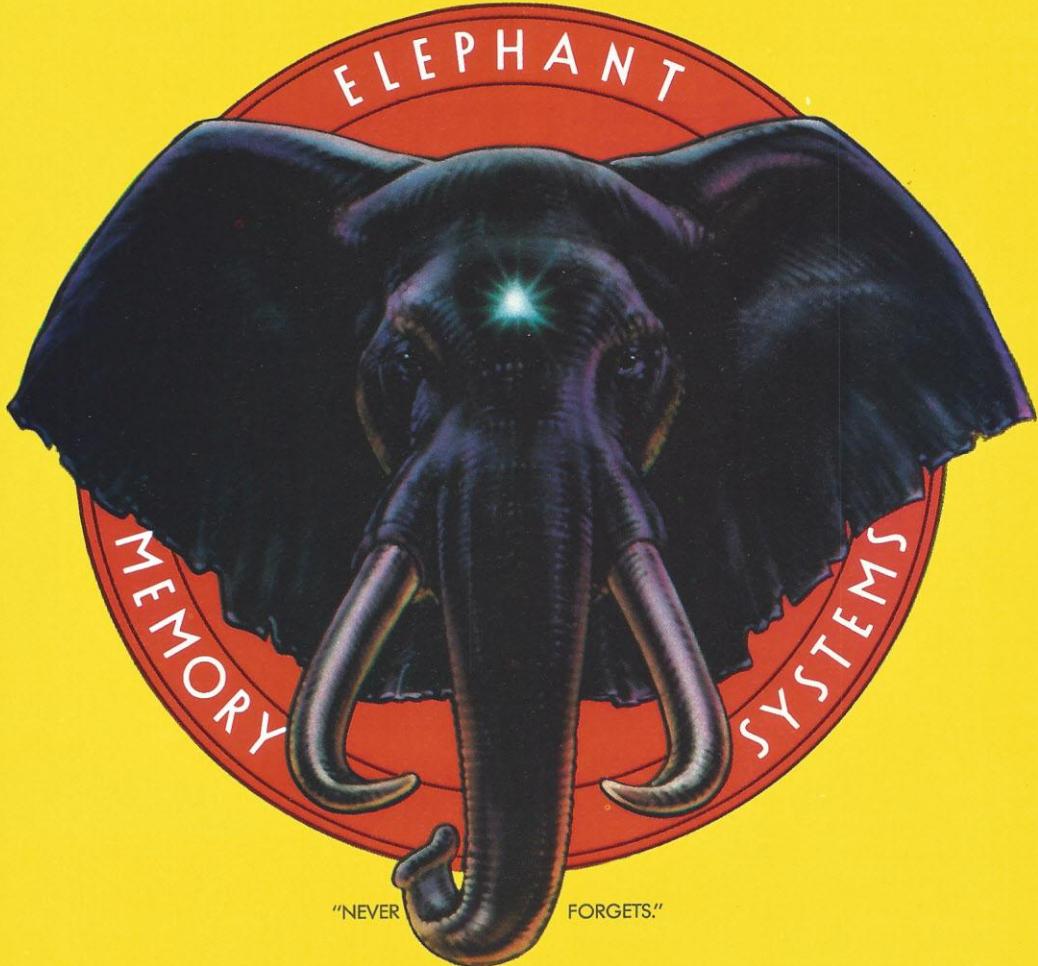
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COMPARE OUR \$995 COMPUTER.

FEATURES	COMMODORE 4016	APPLE II	IBM
Base Price	\$995	\$1,330	\$1,565
12" Green Screen	Standard	299	345
IEEE Interface	Standard	300	NO
TOTAL	\$995	\$1,929	\$1,910
Upper & Lower Case Letters	Standard	NO	Standard
Separate Numeric Key Pad	Standard	NO	Standard
Intelligent Peripherals	Standard	NO	NO
Real Time Clock	Standard	NO	NO
Maximum 5½" Disk Capacity per Drive	500K	143K	160K

Prices are as of the most recent published price lists, September, 1981 and approximate the capabilities of the (16K) PET® 4016. Disk Drives and Printers are not included in prices. Models shown vary in their degree of expandability.

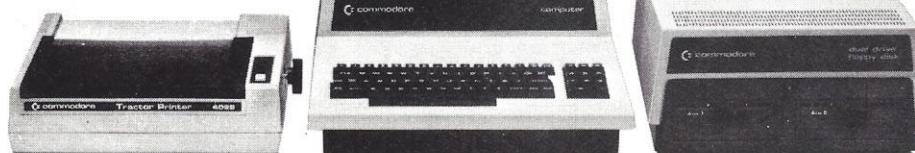
Many experts rate Commodore Computers as the best desk-top computers in their class. They provide more storage power — up to 1,000,000 characters on 5½" dual disks — than any systems in their price range. Most come with a built-in green display screen. With comparable systems, the screen is an added expense. Our systems are more affordable. One reason: we make our own microprocessors. Many competitors use ours. And the compatibility of peripherals and basic programs lets you easily expand your system as your requirements grow. Which helps explain why Commodore is already the No. 1 desk-top computer in Europe with more than a quarter of a million computers sold worldwide.



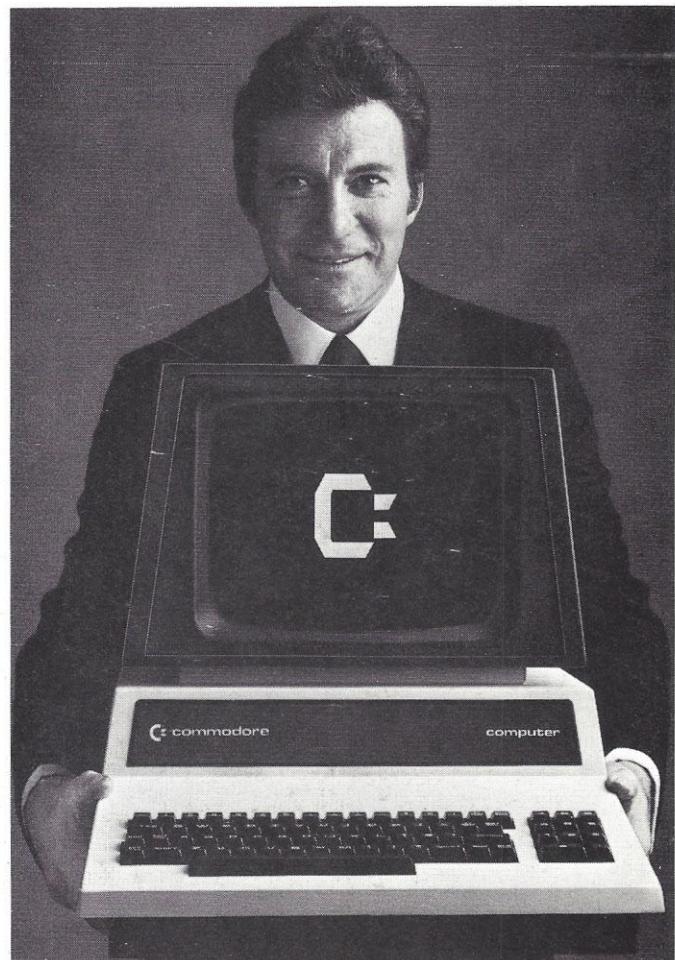
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